A STUDY TO ASSESS THE EFFECTIVENESS OF NUTRITION BALL TO INCREASE HAEMOGLOBIN LEVEL AMONG ADOLESCENT GIRLS WITH ANAEMIA IN SELECTED VILLAGES AT KANYAKUMARI DISTRICT

A DISSERTATION SUBMITTED TO THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI IN PARTIAL FULFILLMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING

OCTOBER 2016

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2014- 2016

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Internal Examiner **External Examiner**

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CERTIFICATE

This is to certify that the dissertation entitled, " **A Study to assess the effectiveness of nutrition ball to increase haemoglobin level among adolescent girls with anaemia in selected villages at kanyakumari district"** is a bonafide work done by Mrs. RATHI . R , II year M.Sc (N), Global College of Nursing, Nattalam in partial fulfillment of the University rules and regulations for the award of M.Sc (N) degree under my guidance and supervision during the academic year October 2014-2016.

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Date with seal:

Name and signature of the head of department:_____

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ABSTRACT

INTRODUCTION

Anaemia is a condition that develops when your blood lacks enough healthy red blood cells or haemoglobin. Haemoglobin is a main part of red blood cells and binds oxygen. If you have too few or abnormal red blood cells, or your haemoglobin is abnormal or low the cells in your body will not get enough oxygen.

STATEMENT

A study to assess the effectiveness of Nutrition ball to increase Haemoglobin level among adolescent girls with anaemia in selected villages at Kanyakumari district.

OBJECTIVES

1. To assess and compare the pre test and post test level of hemoglobin among adolescent girls in experimental and control group.
2. To find out the effectiveness of nutrition ball in haemoglobin level among adolescent girls with anemia in experimental group.
3. To determine the association between the pre test haemoglobin level among adolescent girls with their selected demographic variables in experimental and control group.

RESEARCH METHODOLOGY

The research design adopted for this study was true experimental design. The sample size was 60 was drawn from simple random sampling technique. The feasibility of the study refinement of the tool was assessed through pilot study. The blood haemoglobin level among anaemic adolescent girls was assessed by using haemometer. The data collection for the main study was done from 01-04-2016 to 30-04-2016. Nutrition ball was given for experimental group. Post test was done after intervention period. The data gathered were analyzed by descriptive and inferential statistical method.

FINDINGS OF THE STUDY

In Experimental group the mean score on level of anemia was 9.8 in pre test and 12.4 in post test. The paired‘t’ value was 9.25***** which is significant at p >0.05. It shows that nutrition ball was effective in improving the level of haemoglobin. Hence the research hypothesis (H_1) is accepted.

In Control group the mean score on level of haemoglobin was 8.7 in pre test and 8.8 in post test. The paired‘t’ value was 5.20***** which is significant at p >0.05. It shows that nutrition ball was effective in increasing the haemoglobin level. The mean score on level of haemoglobin in Experimental group was 12.4 in post test and 8.8 in Control group post test. The estimated ' t’ value was 15.24*which is significant at p > 0.05. It shows that Nutrition ball was effective in increasing the haemoglobin level. there is no significant association ($p<0.05$) between the anemia and demographic variables of adolescents in experimental and control group. Hence the research hypothesis H_2 rejected.

CONCLUSION

The study inference revealed that regular practice of nutrition ball could bring out desired increasing in the haemoglobin level among adolescent girls with anemia.

CHAPTER -I

INTRODUCTION

"Adolescence is a new birth, for the higher and more completely human traits are now born"

G.S Stanley Hall

A healthy adult emerges from a healthy adolescent girls. An adolescent girl's nutritional status can have a great impact on their growth and development. In the absence of proper nutrition a state of many nutritional problems may occur.

Adolescence is a "coming of age", as children grow into young adults. These teen years are a period of intense growth, not only physically, but also mentally and socially. During this time, 20% of final adult height and 50% of adult weight are attained . According to WHO estimates, India is one of the countries in the world that has highest prevalence of anemia. WHO estimates that 27 percent of adolescents in developing countries are anemic; the Inter National Centre of Research for Women (ICRW) studies documented high rates in India (55 percent), Nepal (42 percent), Cameroon (32 percent) and Guatemala (48 percent). Anemia prevalence in young adolescent girls continues to remain over 70% in most parts of India and Asia despite a policy being in place and a program that has been initiated for a long time.

Anemia is not a specific entity but an indication of an underlying pathologic process or disease. As many as 4–5 billion people i.e., 66–80% of world's population may be iron deficient. More than 30% of the world's population i.e., 2 billion people are anemic . In total, 800,000 (15%) of deaths are attributed to anemia . Anemia is more common in South Asian countries including, India, Bangladesh and Pakistan than anywhere else in the world. By contrast, the prevalence of anemia in neighbouring countries such as Bangladesh and Pakistan has fallen to 55%. The reduction of anemia prevalence in China is especially remarkable i.e., the prevalence was halved from 20% to the current level of 8% within a decade. It is very difficult to ascertain the true incidence of anemia, as the etiology of anemia is multifactorial.

Iron deficiency is the most common type of anemia in adolescents in India, and an adolescent girl is 10 times more likely to develop anemia than a boy.

Teenagers are at the highest risk of anemia during their adolescent growth spurt. Among girls, however, menstruation increases the risk for iron deficiency anemia throughout their adolescent and childbearing years.

Dietary survey reveled that majority of adolescent girls was non vegetarians. (74.5%). Statistical analysis showed that there is an association between anemia and dietary habits (p value 0.021) among 927 vegetarians, 86(9.27%) were anemic and among 2706 non vegetarians ,328 were anemic. According to NFHS -3 (2005) anemia between 2000-2005 is increased from 74%-79% in adolescent girls aged 10-19 years . As per NFHS -3 report of Tamil nadu adolescent girls aged 13-19 years had 72.7% of anemia.NFHS-2 (2000) National family health survey -2 of india ,about 74% adolescent girls .

World Health Organization global estimates of anemia prevalence averaged 56%, with a range of 35–75% depending on geographic location. Prevalence of anemia in South Asia is among the highest in the world, mirroring overall high rates of malnutrition.

Teenage years are an important first opportunity to be responsible for their own food choices, so it's worrying that so many in this age group are still not getting the nutrition properly. Malnourished children are prone to develop continuous bouts of some illness. This condition can be easily set right if the adolescents eat the right food in the right amount daily i.e., if the childrens consume a balanced diet every day and develop good eating habits for good health.

NEED FOR THE STUDY

In globally, A cross-sectional method was used to study a group of 100 high school students in Kocaeli, Turkey, aged 14 to 19years, identified among 65 high school students. Students from 5 high schools were selected using a random sampling method for detecting the haemoglobin level. Nutrition ball was given to adolescents with anemia for 30 days. Out of 65 participating students (mean age, 14.72+/-0.71 y), anemia (hemoglobin <12 g/dL for girls and <13 g/dL for boys) was detected in 17/36 girls (49.7%) and 6/164 boys (3.6%). Anemia was detected in 20/23 (86.9%) of anemic children [15/17 (88.2%) girls and 4/6 (66.6%) boys]. The prevalence of adolescent anemia in Kocaeli is almost equal to that in developed countries.

In India, the study was carried out by National Nutrition Monitoring Bureau(NNMB) in Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra ,Orissa, Tamil Nadu, and West Bengal. Objectives of the study to estimate haemoglobin level among preschool children, adolescent girls, and pregnant and lactating women. A total of 75600 samples from 633 villages were covered. 3291 preschool children, 6616 adolescent girls, 2983 pregnant women, and 3206 lactating mothers were covered for haemoglobin estimation. The lowest mean haemoglobin level was found among adolescence (9.9g/dl), followed by preschool children (10.3 g/dl), lactating women (10.6 g/dl). There is an urgent need for improving the implementation of national nutrition programmes and strengthening nutrition education.

In Tamilnadu,Cross-sectional study done in three villages near Madurai city, to determine social dimensions related to anemia among women of child bearing age (15-35). To examine various socio demographic aspects related to consumption of micronutrient-rich foods like green leafy vegetables (GLV), samples are 418 women's. Data collected to determine socio-economic and anthropometric (weight, height) variables, Hb, dietary pattern (FFQ) and peripheral smear examination for classifying nutritional anemia . The findings highlight that low consumption of green leafy vegetables, which are treasures of micronutrients including iron, is associated with genuine social reasons. This indicates a need for developing action programme to improve nutritional knowledge and awareness leading to enhanced consumption of iron-rich foods for preventing anemia in rural areas.

In Kanyakumari , a baseline survey on the prevalence of anemia among adolescent girls was conducted by the Christian Medical College and Hospital. The respondents include 155 young girls aged 13-19 years old from the K.V. Kuppam block and 161 from the Gudiyatham block. Their blood was extracted to assess hemoglobin (Hb) concentration. The other data obtained include demographic variables, socioeconomic and nutritional status. Results indicated that prevalence of anemia among girls was 44%. Of these, 2.1% was severe, 6.3% moderate, and 36.5% mild anemia. Prevalence of anemia exists in 40.7% of pre- and 45.2% in post-menarchial girls. It is noted that the education levels of respondents and their mothers had significant association with the concentration of Hb. However, other indicators of nutritional and socioeconomic status are of significant predictors. Overall, the study

illustrates that young girls should be included in the anemia risk group, and that intervention programs are needed to increase the hemoglobin levels among adolescent girls.

The symptoms accompanying iron deficiency depend on how rapidly the anemia develops. In cases of chronic, slow blood loss, the body adapts to the increasing anemia and patients can often tolerate extremely low concentrations of haemoglobin. For example, < 7.0 g/dL, with remarkably few symptoms. Most patients complain of increasing lethargy and dyspnoea. More unusual symptoms are headaches, tinnitus and taste disturbance. Iron deficiency anemia is caused by defective synthesis of haemoglobin, resulting in red cells that are smaller thannormal (microcytic) and contain reduced amounts of haemoglobin (hypochromic). Iron metabolism Iron has a pivotal role in many metabolic processes, and the average adult contains 3–5 g of iron, of which two-thirds is in the oxygen carrying molecule haemoglobin. A normal Western diet provides about 15 mg of iron daily, of which 5–10% is absorbed (~1 mg), principally in the duodenum and upper jejunum, where the acidic conditions help the absorption of iron in the ferrous form. Absorption is helped by the presence of other reducing substances, such as hydrochloric acid and ascorbic acid. The body has the capacity to increase its iron absorption in the face of increased demand, for example, in menstruation, pregnancy and lactation .

From the clinical experience of the investigator at Maruthoorkurichi and kaviyaloor villages many adolescent girls are diagnosis as anemia. The investigator was motivated to assess the effectiveness of nutritional ball among adolescent girls for a period of time to improve haemoglobin level.

STATEMENT OF THE PROBLEM

A study to assess the effectiveness of nutrition ball to increase haemoglobin level among , adolescent girls with anemia in selected villages at kanyakumari district .

OBJECTIVES

1. To assess and compare the pre test and post test level of hemoglobin among adolescent girls in experimental and control group.

2. To find out the effectiveness of nutrition ball in haemoglobin level among adolescent girls with anemia in experimental group.
3. To determine the association between the pre test haemoglobin level among adolescent girls with their selected demographic variables in experimental and control group.

HYPOTHESIS

H_1- There will be a significant difference between the mean pre and post test Haemoglobin level among adolescent girls in experimental and control group.

H_2– There will be significant association in the pre test Haemoglobin level among adolescent girls with the selected demographical variables.

OPERATIONAL DEFINITION

1. EFFECTIVENESS

Effectiveness is the capability of producing a desired results.

In this study effectiveness refers to the outcome of nutritional ball on adolescent girls with anemia.

2. NUTRITION BALL

It refers to the iron rich supplement give to the adolescent girls for the duration of 30 days that contain the proportion of whole wheat -5 gm, Bengal gram- 6gm, groundnut seed -4gm, Raggi -5 gm and Jagerry -10 gm. All the ingrediance are fried, grinded, mixed with hot water and make small balls. Each ball contain 30gm.

3. ADOLESCENT GIRLS

Adolescent girls is a person between ages 13 - 19 years.

It refers the adolescent girls with anemia (10mg/ dl) who are at the age group of 15-18 years in Kaviyaloor and Maruthoorkurichi villages at Kanyakumari district.

4. ANAEMIA

Anemia is defined as a haemoglobin level less than 12mg/dl in women.

It refers to the decreased Hemoglobin level less than 10mg /dl due to decrease intake of dietary iron, menstruation, poor absorption of iron in the diet or any physiological illness.

ASSUMPTION

1. Adolescent girls are prone to develop anemia due to menstruation, insufficient iron in the diet and poor absorption of iron in the body.
2. Dietary intake of iron supplement in form of nutrition ball will improve the haemoglobin level among adolescent girls.

DELIMITATION

The study is delimited to;

i. adolescent girls with anemia aged 15-18 years.
ii. to the period of one month.

CONCEPTUAL FRAMEWORK

The conceptual framework is a global ideas about concept In relation to specific discipline i.e., it is a visual diagram by which the researcher explains the specific area of interest. It is overall printing of a study. The overall purpose is to make research findings meaningful and generalizable.

The conceptual framework for this study was derived from “Modified Nola J. Pender’s Health Promotion Model”. It defines health as a positive dynamic state rather than simply the absence of disease. Health promotion is directed at increasing a patient's level of well-being. The health promotion model describes the multidimensional nature of persons as they interact within their environment to pursue health. Pender’s Health Promotion Model, community program may be focused on activities that can improve the well-being of the people. Health promotion and disease prevention can more easily be carried out in the community, as compared to programs that aim to cure disease conditions.

- **Individual characteristics and experiences**

Each person has unique personal characteristics and experiences that affect subsequent actions.

In this study personal characteristics and experiences include age, food pattern, type of family, family income, menstrual cycle.

- **Behavior-specific cognitions and affect**

The set of variables for behavior specific knowledge and affect have important motivational significance. The variables can be modified through nursing actions.

- Perceived benefits action
- Perceived barriers of action
- Perceived self efficacy
- Interpersonal influence

Perceived benefits of action

The anticipated positive outcomes that will occur from health behavior.

In this study anticipated positive outcome is promotion of health and prevention of illness by intaking of nutrition ball.

Perceived barriers to action

These are anticipated, imagined, or real blocks and costs of understanding a given behavior.

In this study perceived barriers to action is the students had less involvement in reading newspaper, magazines, articles etc and listening TV

Perceived self-efficacy

It is the judgment or personal capability to organize and execute a health-promoting behavior. Perceived self efficacy influences perceived barriers to action so higher efficacy result in lowered perceptions of barriers to the performance of the behavior.

In this study perceived self efficacy means the adolescent girls have individual difference in listening the preparation of nutrition ball and intaking the nutrition ball.

Interpersonal influences

Interpersonal influences include: norms (expectations of significant others), social support (instrumental and emotional encouragement) and modeling (vicarious learning through observing others engaged in a particular behavior). Primary sources of interpersonal influences are families, peers, and healthcare providers.

In this study interpersonal influences include parents, family members, peers, mass media and health workers.

Situational influences

These are personal perceptions and cognitions that can facilitate or impede behavior. They include perceptions of options available, as well as demand characteristics and aesthetic features of the environment in which given health promoting is proposed to take place. Situational influences may have direct or indirect influences on health behavior.

In this study situational influences include peer influence with aesthetic sense and environmental influences such as prayer, food pattern etc.

- **Behavioral outcome**

There is a commitment to a plan of action, which is the concept of intention and identification of a planned strategy that leads to implementation of health behavior.

Commitment to plan of action

These are alternative behaviors over which individuals have low control because there are environmental contingencies such as work or family care responsibilities. Competing preferences are alternative behavior over which individuals exert relatively high control.

In this study plan of action is the health promotion by intaking of nutrition ball among adolescent girls.

Health-promoting behaviour

It is the endpoint or action outcome directed toward attaining a positive health outcome such as optimal well-being, personal fulfillment, and productive living.

In this study health promotion behaviour means, the students read the newspaper, articles, magazine, and engaging other professional activities, will make them engage in health promoting behaviour.

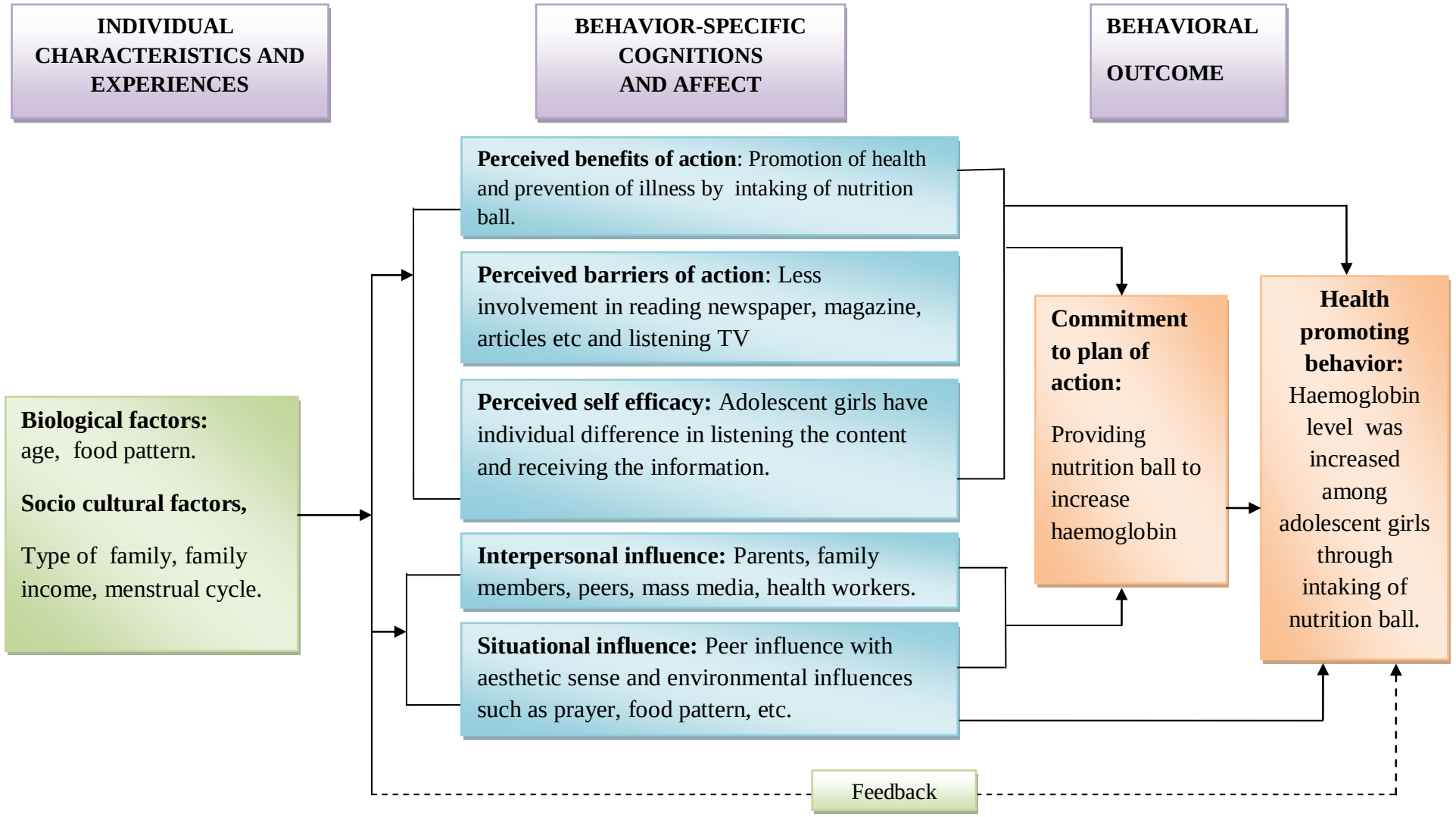

Fig.1: Conceptual Frame Work Based on Pender's Health Promotion Model

CHAPTER-II

REVIEW OF LITERATURE

A review of literature related research and theory on a topic has become a standard and virtually essential activity of scientific research projects "Review of literature is a critical summary of research on a topic of interest, often prepared to put a research problem in contact or as the basis for an implementation project" Review of literature was under- taken to gain depth knowledge on various aspect of the problem under this study

In this study the relavant literature reviewed has been organized and presented under the following headings.

1. Literature related to Prevalence of anaemia among adolescent girls.
2. Literature related to effectiveness of nutrition ball
3. Literature related to the effectiveness of nutrition ball in anemia among adolescent girls.

1. Literature related anaemia among adolescence girls

Gieronhn et al (1998) conducted a study in two distinct socio-economic areas (SEAs) in Baghdad and to assess the importance of diet and some other factors which could be relevant in the epidemiology of anaemia in adolescents. A random sample of 1051 adolescents were included in the present study, 46% of them (487 adolescents) were from Al-Mansoor area for high socio-economic area (HSEA) and 54% of them (564 adolescents) were from AlHorya area for low socio-economic area (LSEA) in Baghdad, Iraq. Collection of data was carried out during the period between November 2006 until the end of April 2007. Haemoglobin concentration and packed cell volume levels were determined. Dietary intake of iron, calories, protein and Vitamin C were estimated. The conclusion of the study was the prevalence of anaemia among adolescents in HSEA was 12.9% compared with 17.6% in LSEA. Haemoglobin concentration in males was significantly correlated with age and dietary iron intake while in females it was correlated

significantly with years of education of father and mother, number of pads and age at menarche. Anaemia among adolescent girls was found to be a health problem in world.

Rajaretnam J et al (2006) conducted a study which focused on anaemia among adolescent girls. The study was conducted in Kumi District, Uganda. Over a period of 4 weeks. The samples are based on a convenience sampling technique 178 adolescent girls (15-18years old) were selected. Results showed that the Nutrition ball was highly effective among adolescent girls with anaemia.

Santos Rf et al (2011) conducted an experimental study to assess the impact of iron supplementation on anaemia during adolescent girls. Salty rice flakes preparation was prepared. Sixty volunteered girls, who were studying in school, undergo experimental trial. Ten non anaemic girls were included in control group. A questionnaire regarding general information was filled up. All the subjects were showing symptoms of anaemia but signs were not same. Majority (90 %) were showing paleness of eyes. Hb values of group B and C were more than the control group A and were found significant in comparison with group A. Thus iron supplementation in both forms (Tablet as well as Food) is helpful in managing anemia .The results concluded that there is a significant difference in anaemic condition of group iron tablet supplemented group (B) and iron Rich Food Supplemented group (C) as compared to control group (A). More improvement in hemoglobin values of group C was also noticed in comparison to group B but statistically the difference was found non significant. It is recommended that both kind of supplementation of iron are helpful in managing anemia among adolescent girls.

Aiebel . et. al (2010) conducted a study for the prevalence of anemia in 433 adolescent girls of the Muynak District of karakal Pakistan ,Uzbekistan. The results showed that the mean Hb level was 9.78 (SD=1.80) gldl. 72.5% of the adolescent girls had anemia (26.3% mild,38.8% moderate (7.4%seveve). The prevalence of anemia rates were 89%,79%,66% and 48% for15, 16, 17, 18 yrs adolescent girls respectively

K.A George. et. al (2000) conducted a study to analyze the anemia nutritional status of adolescent girls in Kerala. 3633 children were participated in this study capillary

blood was collected from each child and hemoglobin was estimated by cyanomethemoglobin method .weight and height of children were measured for assessing their nutritional status. The results showed that over all prevelance of anemia was found to be 11.4% . most of the adolescent girls belongs to low socio economic group .

Ainur Baizhumanova et.al (2010) conducted a study among adolescent girls to evaluate anemia, before and after the copaign in Kyzyl-order region kazakhastan. The study concluded that the communication compaign was effectively carried out in kazakhastan before implementation of the wheat fortified flour gram , giving a biological impact on haemoglobin . The results revealed that after communication the anaemia had siginificantly decreased among rural adolescent girls (from 65.9%- 48.0%).

Heckman J et al(2010) did a study to find out the anaemia and to investicate possible etiologies including malnutrition , intestinal haluminthies infection . 72 adolescent were examined at a community health center in Thohoyandar, Limpopo province. Anemic adolescents were siginificantly less likely to be underweight compared with their peers . The results found that 75% of the adolescent had anaemia and girls were siginificantly more anemic than boys.

2. Literature related to effectiveness of nutrition ball.

Deeksha k et al (2010) conducted a cross-sectional study was to determine the effectiveness of nutrition ball among the adolescents girls in the age group of 14-20 years from 20 different high schools located in three educational areas of Kermanshah, the capital of Kermanshah province in Western Iran. There were 47 girls (12.2%) with anaemia (Hb<12 g/dl and ferritin <20 microg/l). Around 57.3% of anaemic girls were found. There were no significant differences between the presence of anaemia and the level of education of parents. The mean levels of hemoglobin (Hb), hematocrit (Hct), mean corpuscular volume (MCV), mean cell hemoglobin (MCH) and mean cell hemoglobin concentration (MCHC) in studied adolescent girls from Western Iran were found to be lower than those reported for females aged 12-18 years. In conclusion, regarding the detrimental long-term effects and high prevalence of anaemia in

Kermanshah, Western Iran its prevention could be a high priority in the programs of health system of the country and supplementation of a weekly iron dose is recommended.

Sanjay kumarjhal (2012) A study was conducted to find the effectiveness of nutrition ball among adolescent girls in rural and urban schools of Haldwani. A cross-sectional study was carried out in rural as well as urban schools of Haldwani from October 2012 to March 2014 among 770 (443 rural and 327 urban) adolescent girls selected by random sampling, using predesigned and pretested questionnaire to collect relevant data, and estimating haemoglobin concentration using Haemometer. 48.18% of adolescent girls were found to have anaemia. Nutrition ball was effective in anaemia was 43.11% and 55.04% among rural and urban school girls respectively. The present study revealed that half of the school going adolescent girls were suffering from anaemia in rural and urban areas of Haldwani. The study concluded that Nutrition ball was effective among anaemic adolescent girls.

Dr. LipilekhaPatnaik (1998) conducted a cross sectional study to find the effectiveness of nutrition ball among adolescent girls. The study showed that anaemia cases was found to be 78.8%. Out of 119 anaemic girls, 75.6% girls were suffering from mild degree of anaemia and 24.4% girls were having moderate degree of anemia. Nobody was suffering from severe anemia. Effectiveness of nutrition ball among adolescent girls significantly higher in girls of illiterate or primary educated mothers, low socioeconomic status families, history of excessive menstrual bleeding and girls with under nutrition.

Premalatha(2002) conducted a cross-sectional study which was executed among 400 female school students in the age group of 13-17 years in Chennai. Socio demographic details, anthropometric measurements were obtained. Haemoglobin was estimated using cyan method. Anaemia was found among school students. Chi-square statistics shows significant association ($p<0.05$) of anaemia is with type of family, socioeconomic status and diet. In this study 42.5% of girls with BMI<18 were found to be anaemic.

N .Arlappa (2008) conducted a study to carried out to find the effectiveness of nutrition ball of anaemia among girls of school going age (6-18 years) residing in 15 randomly selected slums of the north zone of Ahmedabad city. The general information about age, height, body weight, haemoglobin level (Sahli's method), parent's education, parent's occupation, socioeconomic status, knowledge about anaemia, status of menstruation and regarding the consumption of various diets factors were recorded on a structured questionnaire. Out of the 1295 girls, 1153(89.0%) agreed to give blood samples for haemoglobin estimation. The effectiveness of nutrition ball of anaemia among the girls in this study was higher than that observed in the urban slums of north east Delhi.

Rocha ds et al (2009) conducted a community-based cross-sectional study was carried out over a period of two months to assess the effectiveness of nutrition ball among adolescent girls in selected villages of the Kolar district. 230 adolescent girls of age 10–19 years were selected randomly. Data was collected by interviewing the adolescent girls using predesigned and pre tested Performa. The prevalence of wasting and stunting was 54.79% and 32.17% respectively as per water lows classification and the trend of wasting and stunting declines with the age. The prevalence of thinness was found to be 73.5% as per Indian standards. It is concluded that there is a high effectiveness of nutrition ball among adolescent girls in the rural area of the selected villages.

Lozoff B et. al (2007) conducted a cross-sectional study for the effectiveness of nutrition ball among adolescent girls in Iranian females aged 18–25 years old from October 2005 to October 2006. 295 female students from the Tehran University of Medical Sciences, Iran, were recruited for the study. A detailed physical examination was conducted on all the participants. Blood samples were obtained. Serum iron and total iron binding capacity levels were measured using a commercially available kit . The haemoglobin (Hb) and mean corpuscular volumes (MCV) were analysed on the cell counter. The concentration levels of serum ferritin were measured using radio-immunoassay. The conclusion of the study is total of 295 individuals participated in the study, out of which 237 were included in the final analysis. Their ages ranged from 18 to

25 years, with a mean age of 19.8 years. Among the 224 participants who were categorised into the study groups, 118 (52.7%) had a normal iron status (Group 1), nine (4.0%) suffered from Anemia (Group 3) and 97 (43.3%) had Iron Deficiency (ID) without anemia (Group 2). There were a significant differences in terms of the ferritin, iron and TS levels between the ID and normal groups ($p < 0.00005$). Considerable differences were also found for all the indices between the ID and IDA groups ($p < 0.00005$). The indices of the iron status were significantly different between the normal and IDA groups ($p < 0.00005$).The study was concluded that Nutrition ball was highly effective in adolescent girls with anaemia.

Choudhary et. al (2008) conducted a cross-sectional study to determine the effectiveness of nutrition ball among adolescent girls with anaemia in an urban slum setting. A total of 100 apparently healthy girls between the ages of 11 and 18 years were recruited. Their socioeconomic, dietary and anthropometric information was collected, and blood haemoglobin (Hb) was estimated. The prevalence of anaemia (Hb< 12 g%) was 29%. Most had mild anaemia; severe anaemia was not seen. Two-thirds of those with anaemia had low serum ferritin (<12 microg/L). Significant associations were observed between anaemia and low socioeconomic status, religion and reporting infrequent/non-consumption of meat (heme iron). Only meat consumption was related to haemoglobin by multiple regression analysis. Anaemia is a common problem among adolescent girls in this setting, though severe anaemia is rare. There is a need to improve their haemoglobin status through dietary modification along with preventive supplementation and nutrition education.

BahaaAbalkhail et. al (2002)) A study among 800 school students in Jeddah, Saudi Arabia to identify the effectiveness of nutrition ball and their awareness about anaemia and the relation of anemia with the literacy level of mothers. The results indicated that 20.5% of students had anemia. Only 34.1% anemic students were aware of being anemic. Anemia was significantly more prevalent among those born to low educated mothers .

3. Literature related to effectiveness nutrition ball in anaemia among adolescent girls

Amatheum et.al (2008) conducted an experimental study to assess the daily consumption of nutrition ball raises blood level of haemoglobin among adolescent girls. According to research presented at 227th meeting of the American chemical society, the investigator selected 75 samples by using purposive sampling technique .The investigator gave 30 study participants each about 30gm nutrition ball for 30 days in addition to their regular diets and drew blood samples at given intervals following nutrition ball consumption . The findings of the study showed nutrition ball consumption increase the level of hemoglobin in their blood.

Fessendan(2008) presented research papers on the effectiveness of nutrition ball upon immunity in the first international symposium on nutrition ball and human health , held in sacramento. The study was conducted in rural slum area, totally 110 anaemia cases were selected in simple random sampling method. Nutrition ball was given for 30 days as intervention for anaemic adolescent girls. The conclusion of this study showed that the nutritional ball is effective in increasing haemoglobin level.

Allahabad university research team The government agriculture and processed food products expert development authority (2008) discovered that when nutrition ball is taken regularly as a dietary supplement it is more effective in increasing the haemoglobin level. Studies indicate that nutrition ball has highly effectiveness in increasing haemoglobin level.

Adish et. al (1999) a study was conducted in the registered slums under India Population Project-VIII, MCH, located in twin cities of Hyderabad and Secunderabad, Andhra Pradesh, India. Girls between 15 to 19 years of age were covered in the study to assess the nutritional status of adolescent girls. From each of the 100 slums, a quota of 25 adolescent girls, a total of 2500 respondents were covered, which accounted for 63% of all adolescent girls available in the study areas. A combination of methods, anthropometry, biochemical analysis, dietary assessment and interview schedule was used for assessing the nutritional status and nutritional knowledge of adolescent girls.

The samples were selected by using simple random sampling technique. The tool used for the study was haemometer. Nutrition ball was given for 30 days intervention. After the intervention significant association among adolescent girls. It was concluded that the intervention resulted in improvement of haemoglobin level among adolescent girls.

Jain et. al (2000) a recent study was carried out on 1142 adolescent girls residing in 16 slums of Pune from 2006-2009. The main objective was to increase the haemoglobin level among adolescent girls . Nutrition ball were given for one month. ongoing nutrition education through home visits and meetings was done by community health workers, participatory activities were undertaken such as food fairs, community projects were undertaken through life skills programme; audiovisual materials such as flash cards and posters were developed by the adolescent participants. Blood samples were collected at baseline and end of the study, and haemoglobin was estimated. Findings showed that nutrition ball has highly effective among adolescent girls. Blood testing showed that mean Hb levels increased from 5.8 to 9.5 gm/ dl for severely anaemic 3girls, and from 8.9 to 11.2 gm/ dl for moderately anaemic girls.

Brunken et. al (2002) a recent study was conducted in the Zone 3 of the Axom Villa Libertad barrio in Managua, the capital of Nicaragua. This research examines the impact of a nutrition ball intervention program among adolescent girls.. Data analyzed here were collected from a sample of 186 adolescent girls ages 10 to 17 .years at three consecutive dates, two prior to the participation in the nutrition ball intervention program. Using a pre-test/post-test design, data are compared prior to and after the nutrition intervention program. The study concluded that there is a significant differences in haemoglobin level among adolescent girls. This research has implications concerning the development of successful adolescent focused nutrition intervention programs in Nicaragua, and examines the possibility that catch-up growth occurs during adolescence.

Muoneke et. al (2011) a cross-sectional study was conducted among adolescents (10–16 years) enrolled in a single public school in São Paulo, Brazil. Of 400 eligible students, 195 agreed to participate. A blood sample was collected from each subject to measure hemoglobin. All of the subjects with anaemia. Anaemia was detected in 35%

(44/194) of the students, half of whom were infected. The mean hemoglobin value in infected subjects was 13.83 g/dL ± 1.02 versus 14 g/dL ± 1.06 in uninfected subjects.

Sharadasidhu et.al (2005) across-sectional survey was conducted in an urban area under Urban Health Training Centre, Department of Preventive and Social Medicine, Government Medical College and Hospital, Nagpur. A total of 296 adolescent females (10-19 years old) were included in this study. The study took place from October 2008 to March 2009.The sample were selected by using simple random sampling technique. Quantitative approach was used . Nutrition ball was given among adolescent girls. The effectiveness of nutrition ball was found to be 35.1%. A significant association of anaemia was found with socio-economic status and literacy status of parents. Conclusions of this study was a high effectiveness of nutrition ball among adolescent girls.

Anna christofides et. al (2005) conducted a study to determine the effectiveness of nutrition ball to increase haemoglobin level among adolescent girls in banglore India. A randomized, double-blind, controlled school-based feeding trial was done in 15 to 18 years old anaemic adolescent girls. Subsequently, all 15 to 18 years old adolescent girls are participating in the trial (n = 134) were followed to determine the effectiveness of nutrition ball to increase haemoglobin level. The samples were selected based on simple random sampling technique. Nutrition ball was given for 30 days intervention. There was a significant increase in haemoglobin .

Herbotech (2009) An experimental study was conducted among staffs and students of St John's Medical college at Bangalore India. a total of 40 adolescent girls aged 15-18 years were selected as sample. Each study contained 10 experimental and 10 control subjects. The samples were selected as purposive sampling technique. Collection of data by using survey method. Nutrition ball was given for the adolescent girls . After that haemoglobin was checked through haemometer. At the end of study there was a different in the hb level between the experimental and control group.. The study concluded that there is highly effective in Nutrition ball among adolescent girl with anaemia.

CHAPTER – III

METHODOLOGY

Research Methodology

The methodology of this study includes the research approach and research design setting of the study, description of population, sample, sample size, sampling Technique, developing and testing of the tool, method of data collection and plan for data analysis.

Research Approach

Polit and Hungler, (2004) defined the research approach as "a general set of orderly discipline procedure used to acquire information".

To accomplish the objectives of this study, A quantitative approach was used to determine the effectiveness of nutrition ball to increase haemoglobin level.

Research Design

Polit and Hungler, (2004) defined research design as "overall plan for addressing a research questions, including specification for enhancing the study integrity.

True experimental design was used for the present study, were pre test and post test control group design was hospitalized to evaluate the effectiveness of nutrition ball on haemoglobin level.

The research design adopted for this study was True experimental research design

Group	Pre-test	Intervention	Post test
Experimental	E_1	X	E_2
Control	C_1	-	C_2

E_1-Experimental group pre test

E_2-Experimental group post test

C_1- Control group pre test

C_2-Control group post test

X- Intervention

Variables

Research Variable

Dependant Variable

The variable hypothesis to depend on or be caused by another variable ,the outcome variable of interest (Polit and Hungler 2004).

Dependent variable is Anemia.

Independent Variable

Polit and Hungler (2004) defined independent variables as "The variable that is believed to cause or influence the dependent variable; in experimental research, the manipulated variable".

Independent variable is nutrition ball.

Demographic variable

The demographical variable of adolescent girls such as age , food pattern, type of family, family income, religion, educational status and menstrual cycle.

SETTING OF THE STUDY

The physical location and condition in which data collection takes place in a study is the setting of the study .(Polit and Hungier,2001).

The study was plan to conducted in Kaviyaloor and Maruthoorkurichi villages, before conduction of study the investigator obtained permission from the ethical committee of Global College of Nursing, Nattalam . Then the researcher obtained formal permission from the medical officer of primary health centre, Palliyadi to conduct main study.

In this study population composed of adolescent girls aged 15-18 years with anaemia (less than10mg/ dl) **.**

POPULATION

A population is the entire aggregation of cases in which a researcher has interested(Polit and Hungler 2005).

A study population composed of adolescent girls with anemia in the age group of 15-18 years residing of Kaviyaloor and Maruthoorkurichi villages at Kanyakumari district.

SAMPLE

Sample consist of the subset of the population selected to participate in the research study (Polit and Beck 2012).

In this study the samples were adolescent girls with anemia (less than 10mg/ dl) age of 15-18 years who fulfill the inclusive criteria residing area Kaviyaloor and Maruthoorkurichi villages.

SAMPLE SIZE

Sample size is the total number of study participants participating in a study(Polit 2008).

The sample size of the study was 60. Among them 30 samples were allotted to experimental group and remaining 30 samples were allotted to control group.

SAMPLIG TECHNIQUE

It is the process of selecting the subject from a population in order to obtain information regarding a phenomenon in a way that represents in a entire population (Polit 2010).

Simple random sampling method was used to select the sample.

CRITERIA FOR SAMPLE SELECTION

The sample was selected based on the following inclusion and exclusion criteria.

Inclusion criteria

The study includes the adolescent girls:

1. With anemia (Hb less than 10mg/ dl)during the time of data collection.
2. Who are in the age group of 15 to 18 years

Exclusion criteria

The study excludes the adolescent girls who are:

1. Having any other blood disorders such as sickle cell anaemia, haemophilia, and thrombocytopenia.
2. Not willing to participate in the study.
3. Not available during the time of data collection.

DESCRIPTION OF THE TOOL

The tool is a written device that a researcher uses to collect the data. The tool consist of two sections.

Section A- A structured interview questionnaire will be used to assess the demographical variable of adolescent girls such as age, family income, religion, educational status, food pattern and menstrual cycle.

Section B- Haemometer will be used to assess the level of Haemoglobin of the adolescent girls who are having anaemia.

CONTENT VALIDITY

Content validity of the tool was established by 6 experts including 5 nursing experts in the field of Community Health Nursing and a medical officer. The experts were requested to give their opinion and suggestion for further modification of items to

improve the clarity and content of the items. The final tool was prepared as per the suggestions and advices given by the experts.

RELIABILITY

The tool used in this study was standardized one.

PILOT STUDY

The pilot study was done after obtaining permission from the principal of Global College Of Nursing and the medical officer of Primary health centre, palliyadi ,and the family members. The study was conducted in cherikadai . The investigator introduced herself to the study subjects and established good rapport. Then the investigator gave a short introduction about her study. The pre test haemoglobin level was assessed by haemometer on the 1st day. The samples were selected using the simple random sampling technique. Six samples were selected. In that, three samples were allotted for experimental group and three samples were allotted for control group through randomization. Nutrition ball was given for the experimental group for 30 days. The post test haemoglobin level was evaluated for both groups after intervention by using haemometer through simple random sampling technique.

METHOD OF DATA COLLECTION

Before conducting the study the formal concent from the principal of Global College Of Nursing, and the medical officer of the Primary Health Centre Palliyadi. The study was conducted at Maruthoorkurichi and Kaviyaloor villages from 1-04-2016 t0 30-04-2016. The investigator screened the anaemia cases from the Primary health centre, Palliyadi. There are 345 new cases were identified by this year 2016. Then the investigator starts the data collection procedure and identified anemic adolescent girls through survey method. Introduction about investigator was given to samples. Good rapport was established with the clients, assured that information would be kept confidential. The 60 samples were selected by simple random sampling technique based on inclusion criteria. Haemometer was used for data collection as a tool.

Then pre test was conducted. Investigator selected 30 samples from Kaviyaloor village for Experimental group and 30 samples from Maruthoorkurichi village for Control group Then the investigator gave Nutrition ball daily for 30 days to the Experimental group. Intervention was not given for Control group. After intervention, the investigator conducted post test for Experimental group and Control group.

PLAN FOR DATA ANALYSIS

Both descriptive and inferential statistics were used to analyze the data.

Descriptive statistics

1. Frequency and percentage distribution was used to analyze the demographic variables.
2. Frequency and percentage distribution was used to evaluate the level of blood haemoglobin.
3. Mean and standard deviation was used to evaluate the effectiveness of nutrition ball in the level of haemoglobin.

Inferential statistics

1. Paired ‘t’ test was used compare the pre test and post test level of haemoglobin level of experimental and control group.
2. Chi -square test was used to find out the association of the pre test level of haemoglobin in experimental group and control group with the selected demographic variables.

PROTECTION OF HUMAN RIGHTS

The proposed study was conducted after the approval of the dissertation and ethical clearance committee of Global College of Nursing. Formal permission was obtained from the medical officer of Primary health centre, Palliyadi. Informed written consent was obtained from each participants of the family before starting the data collection.

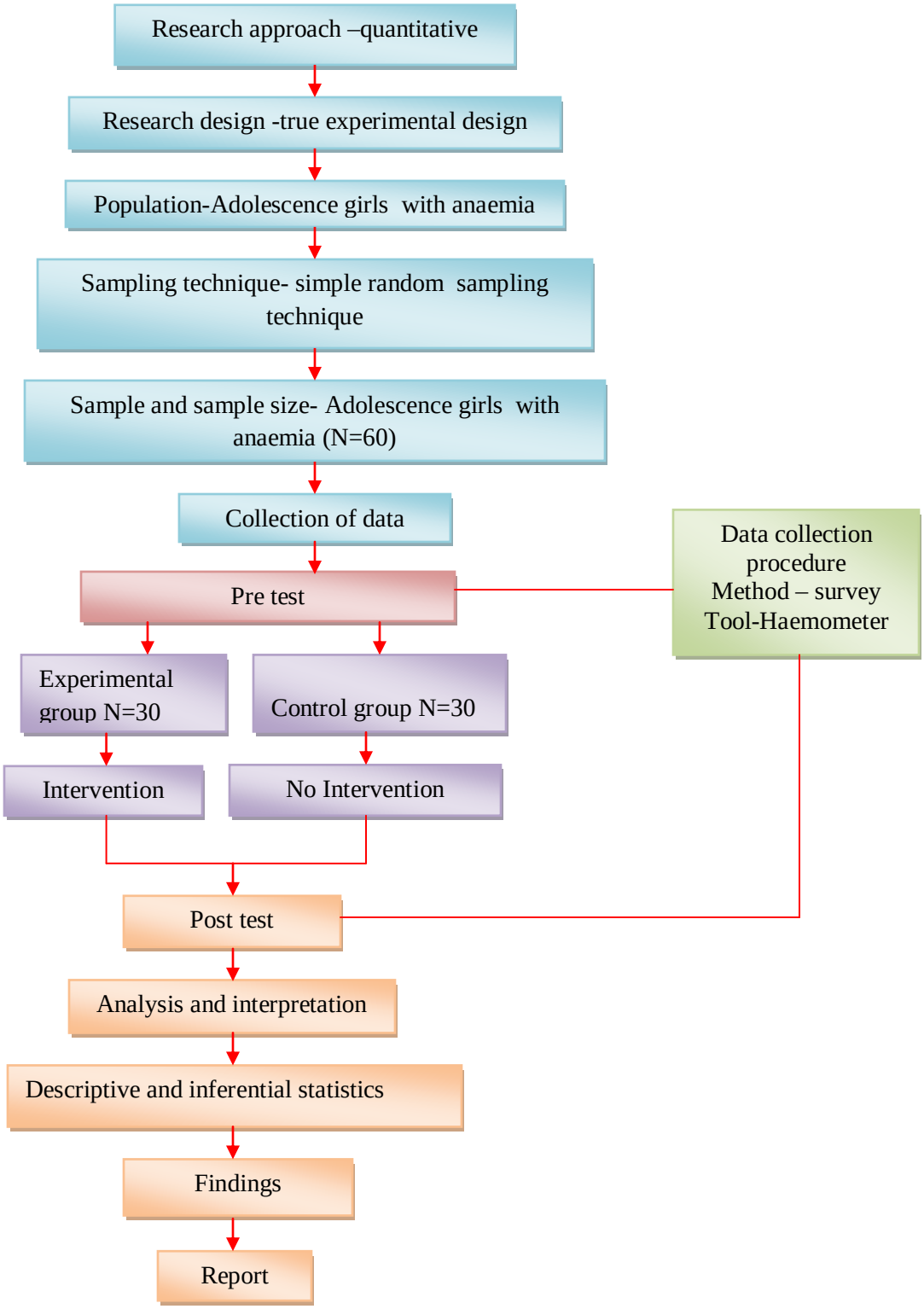

Fig 2 Schematic Representation of Research Design

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

Research data must be processed and analyzed in an orderly fashion so that patterns and relationship can be discerned and validated, and hypothesis can be tested. Quantitative data analyzed through statistical analysis includes simple procedures as well as complex and sophisticated methods.

This chapter deal with the analysis and interpretation of the data collected from anaemic adolescent girls. The interpretation of tabulated data can bring to light the real meaning of findings of the study. In order to find meaningful answers to the research questions the collected data must be processed and analyzed in some orderly coherent fashion, so that patterns and relationships can be discerned. In this study the data was analyzed based on the objectives and hypothesis of the study using descriptive and inferential statistics.

PRESENTATION OF DATA

This chapter is divided into four sections,

Section-A: i. Distribution of the sample according to the demographic variables in Experimental group and Control group.

Section-B: i. Distribution of sample in Experimental group and Control group according to the level of haemoglobin before intervention.

ii. Distribution of sample in Experimental group and Control group according to the level of haemoglobin after intervention.

Section-C: Testing Hypotheses.

i. Comparision of pre test and post test level of haemoglobin in Experimental group and Control group.

ii. Comparision of post test level of haemoglobin Experimental group and Control group.

Section-D: i. Association between the pre test level of haemoglobin in Experimental group and Control group with their demographic variables.

SECTION: A

DISTRIBUTION OF THE SAMPLE ACCORDING TO THE DEMOGRAPHIC VARIABLES IN EXPERIMENTAL GROUP AND CONTROL GROUP

Table - 4

Frequency and percentage distribution of demographic variables of the level of haemoglobin with respect to age, food pattern, type of family, family income, religion, menstrual cycle in Experimental group and Control group.

(N = 60)

S.No	Demographic variables	Experimental group n=30		Control Group n=30	
		f	%	f	%
1.	**Age**				
	a. 15-16yrs	23	76.7.	19	63.3
	b. 17-18yrs	7	23.3	11	36.7
	c. Above 18 yrs	0	0	0	0
2.	**Food pattern**				
	a. vegetarian	10	33.3	7	23.3
	b. non vegetarian	20	66.7	23	76.7
3	**Type of family**				
	a. nuclear family	22	73.3	21	70.0
	b. joint family	8	26.7	9	30.0
4	**Family income**				
	a. Below 2000	4	13.3	3	10
	b. 2000-4000	18	60	12	40
	c. 4000-6000	6	20	13	43.3
	d. Above 6000	2	6.7	2	6.7
5	**Religion**				
	a. Hindu	25	83.3	5	16.7
	b. Christian	5	16.7	25	83.3
	c. Muslim	0	0	0	0
6	**Menstural cycle**				
	a. 2 -3days	14	46.7	11	36.7
	b. 4-5days	12	40.0	9	30
	c. 6-7days	2	6.7	7	23.3
	d. Above 7 days	2	6.6	3	10

The table- 1 shows with regard to that Age in years in experimental group ,23(76.7%) were in the age group of 15-16 years, 7(23.3%) were in the age group were in the age group of above 18 years. 0 (0%) , where as in the control group ,19(63.3%) were in the age group of 15-16years, 11(36.7%) were in the age group of 17-18 years,0(0%) were in the age group of above 18 years,

Regarding the food pattern in experimental group 10(33.3%) were vegetarian, 20(76.7%) were non vegetarian. In control group 7(23.33%) were vegetarian, 23(76.67%) were non vegetarian

Regarding the type of family in experimental group 22(73.3 %) were nuclear family, 8(26.7%) were joint family. In control group 21(70%) were in nuclear family , 9(30%) were in joint family.

Regarding family income in experimental group 4(13.3%) were below 2000, 18(60%) were 2000-4000,6(20%) were 4000-6000, 2(6.7%) were above 6000.In control group 3(10%) were below 2000 ,12(40%) were 2000-4000, 13(43.3 %) were 4000-6000, 2(6.7%) were above 6000.

Regarding the religion in experimental group 25(83.3%) were Hindu, 5(16.7%) were Christian, 0(0%) were Muslim .In control group 5(16.7%) were Hindu, 25(83.3%) were Christian, 0(0%) were Muslim .

Regarding menstrual cycle in experimental group 14(46.7%) were 2-3 days, 12(40%) were 4-5 days, 2(6.7%)were 6-7 days, 2(6.6%) above 7 days . In control group 11(36.7%) were 2-3 days , 9(30%) were 4-5 days, 7(23.3%) were 6-7 days ,3(10%) were above 7 days.

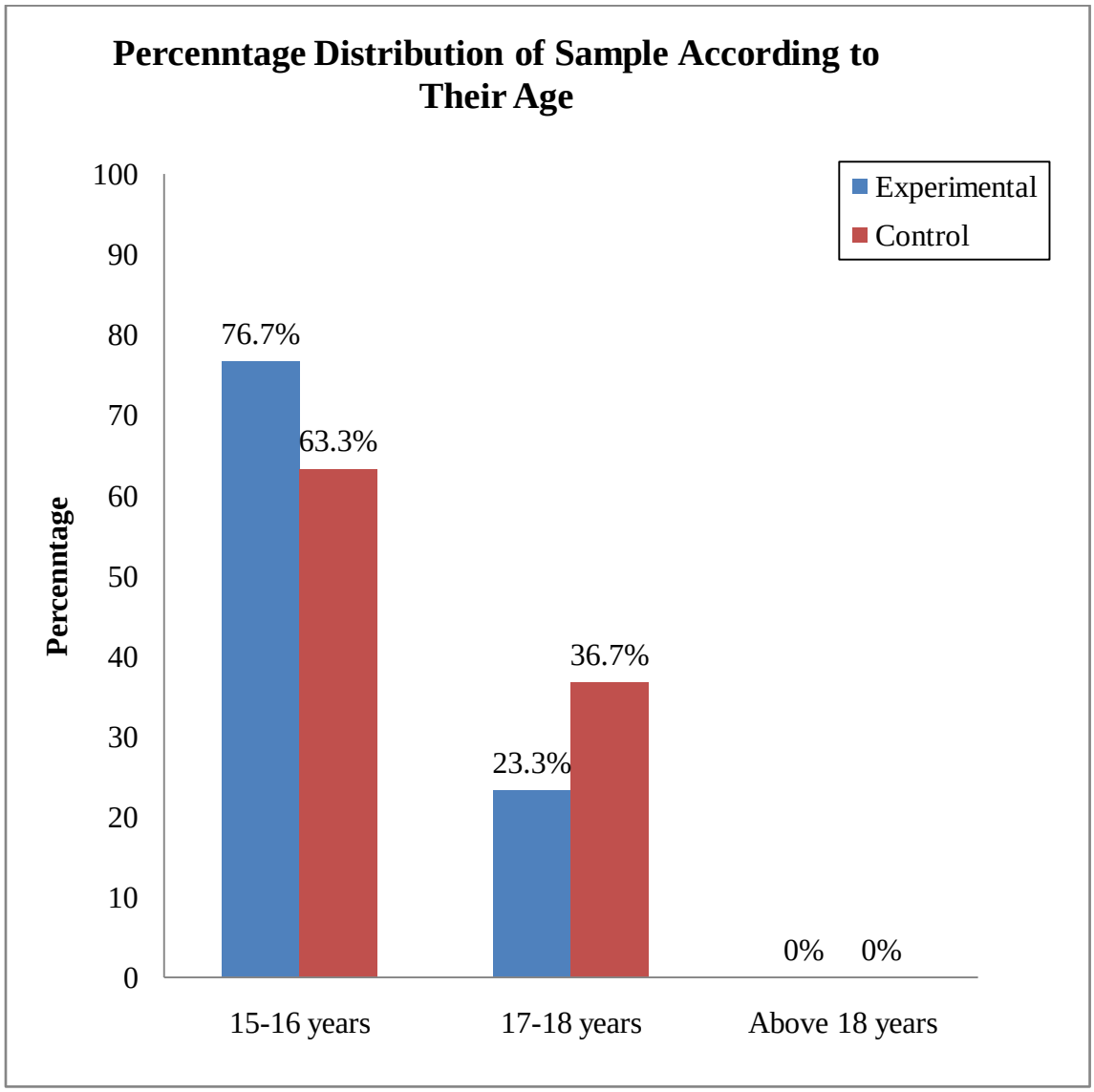

Fig 3 Percentage Distribution Sample According to their age

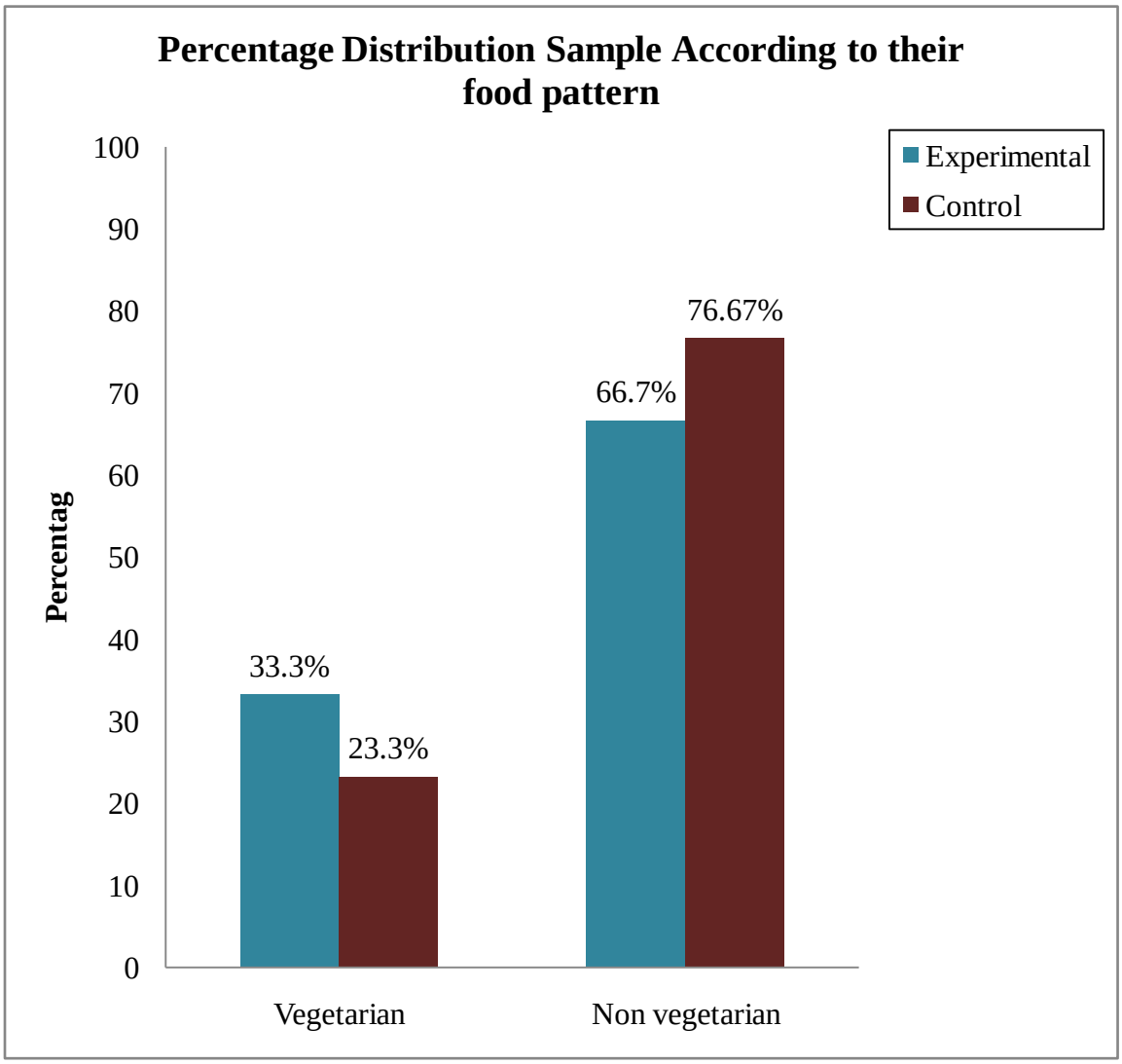

Fig - 4 Percentage Distribution Sample According to their food pattern

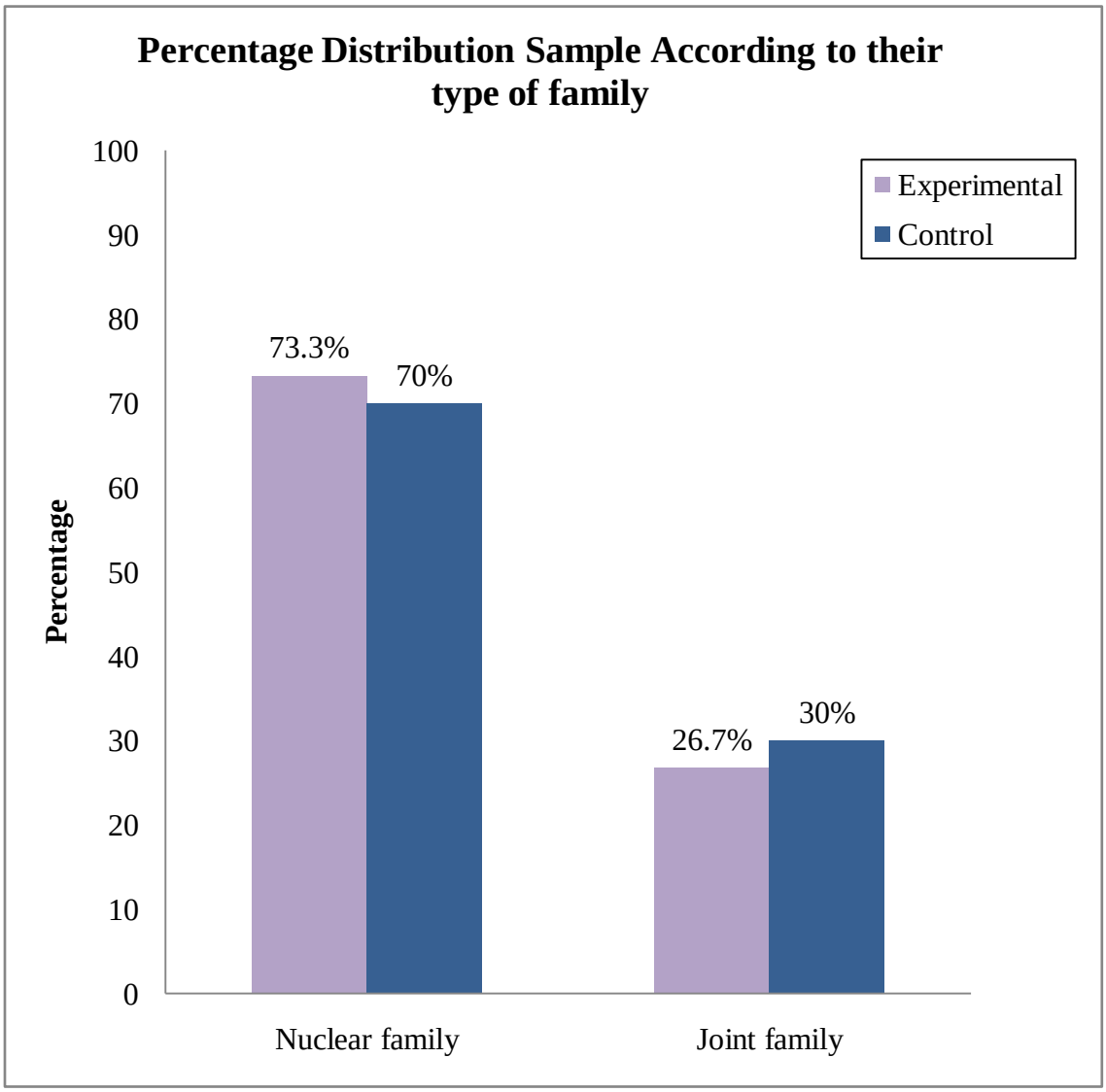

Fig - 5 Percentage Distribution Sample According to their type of family

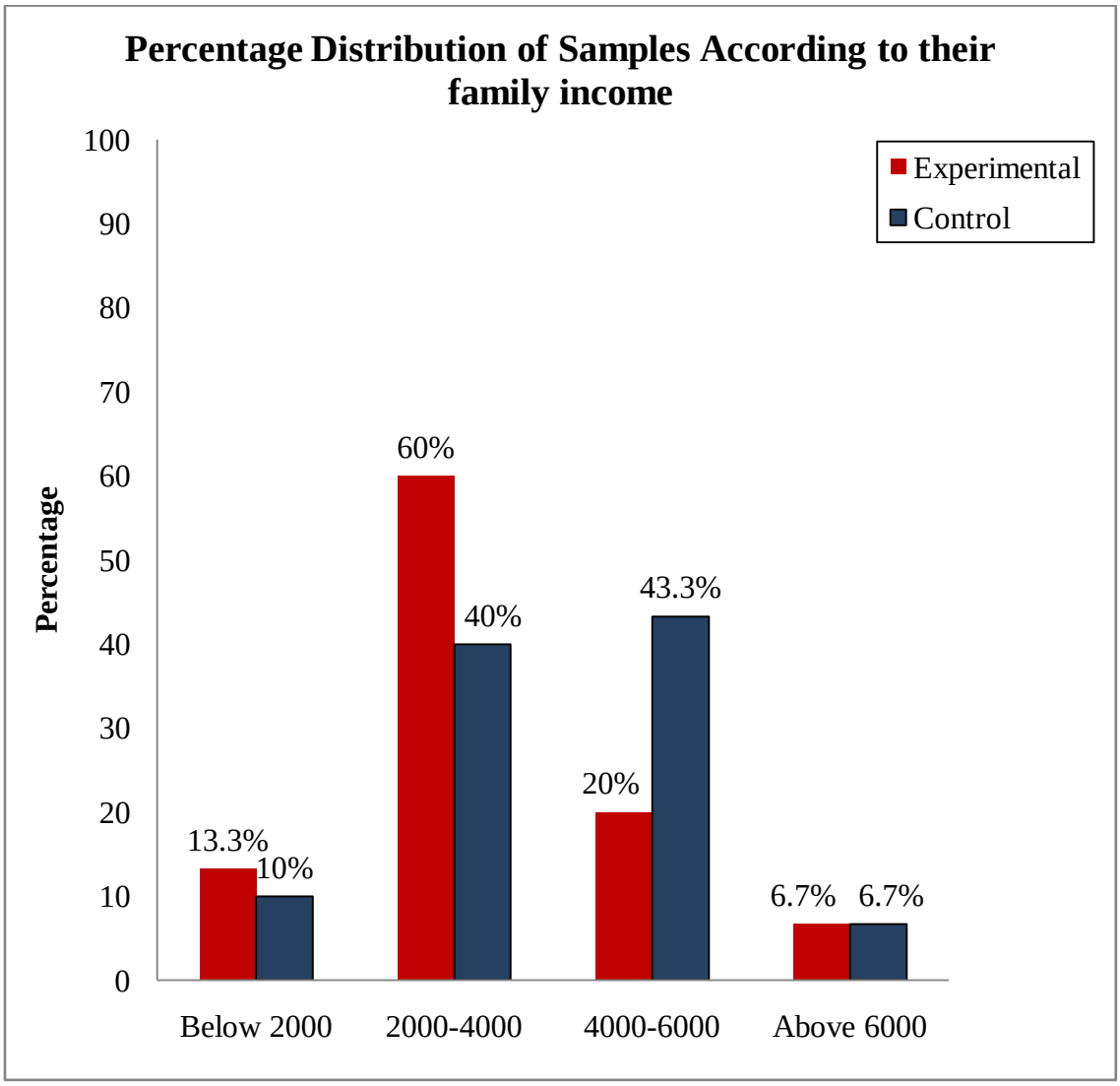

Fig- 6 Percentage Distribution of Samples According to their family income

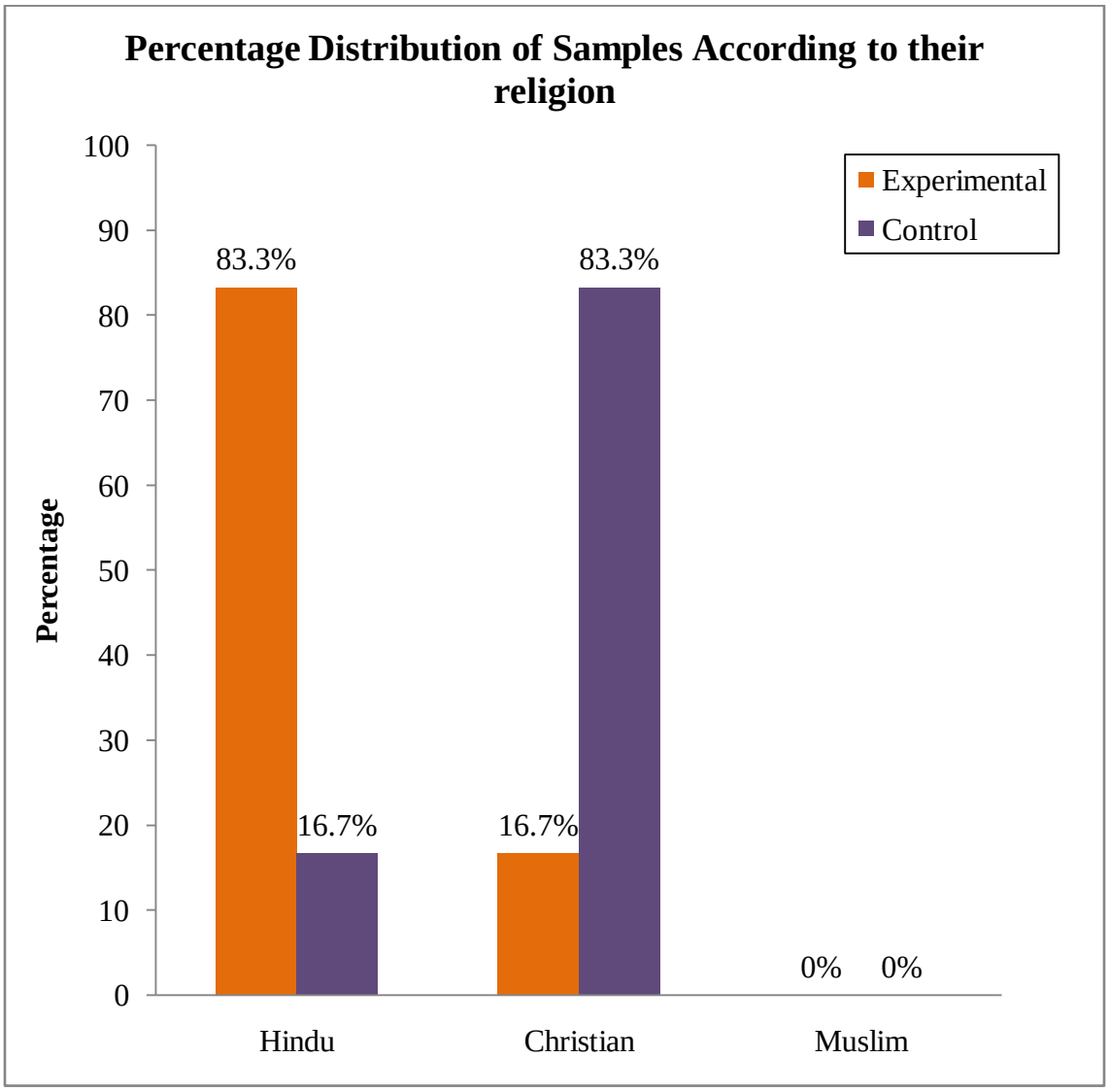

Fig - 7 Percentage Distribution of Samples According to their religion

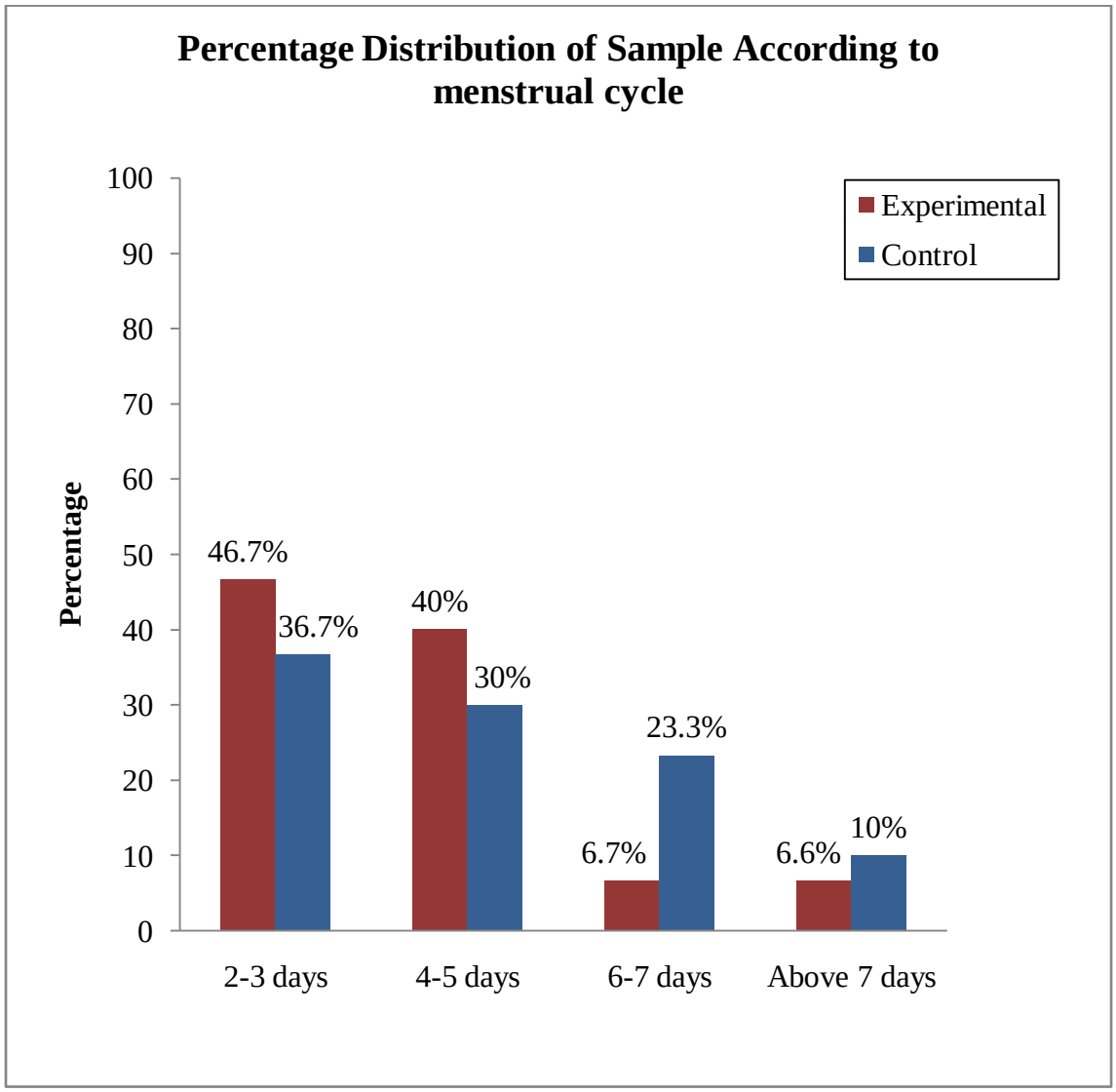

Fig - 8 Percentage Distribution of Sample According to menstrual cycle

SECTION-B

Distribution of Sample in Experimental Group and Control Group According to the Level of haemoglobin.

Table 2 Frequency and percentage distribution of adolescent girls according to the level of haemoglobin in Experimental group and Control group before intervention.

N=60

S. No	Level of haemoglobin	Pre test			
		Experimental group n=30		Control group n=30	
		f	%	f	%
1.	Normal	0	0	0	0
2.	Mild	23	76.7	18	60
3.	Moderate	4	13.3	8	26.7
4.	Severe	3	10	4	13.3

During pretest, in Experimental group 0(0%) had Normal level of haemoglobin, 23(76.7%) had mild level of haemoglobin, 4(13.3%) had Moderate level of haemoglobin, 3(10%) had severe level of haemoglobin. In Control group, 0(0%) had Normal level of haemoglobin, 18(60%) had mild level of haemoglobin, 8(26.7%) had Moderate level of haemoglobin, 4(13.3%) had severe level of haemoglobin.

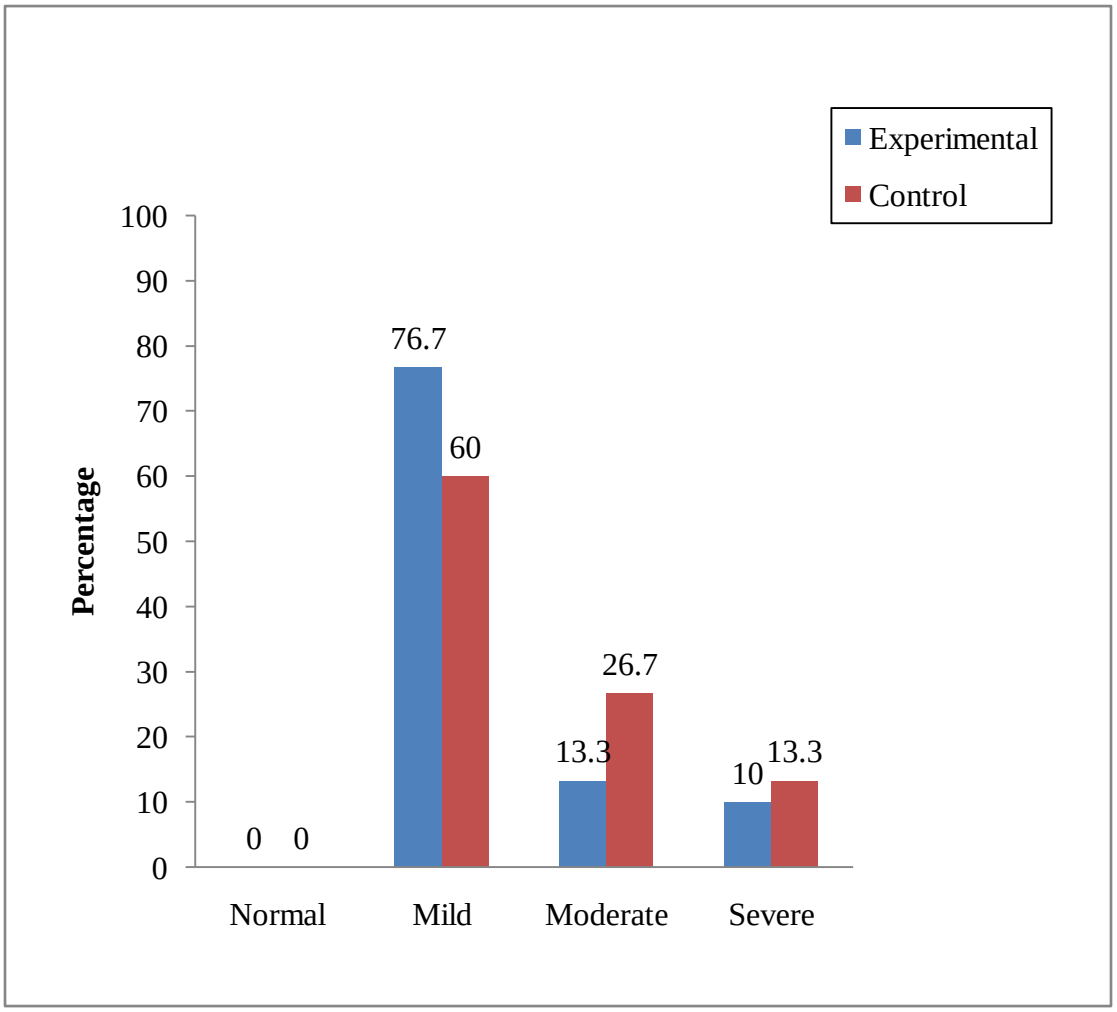

Fig -9 Distribution of Sample According to the Level Of anemia Before Intervention

Table - 3 Distribution of sample according to the Level of haemoglobin After Intervention

Frequency and percentage distribution of adolescent girls according to the level of haemoglobin in Experimental group and Control group after intervention

N =60

S. No	Level of haemoglobin	Post test			
		Experimental group n=30		Control group n=30	
		f	%	f	%
1.	Normal	23	76.7	0	0
2.	Mild	5	16.7	16	53.3
3.	Moderate	2	6.6	8	26.7
4.	severe	0	0	6	20

During post test, in Experimental group, 23(76.7%) had Normal level of anemia, 5(16.7%) had mild level of anemia, 2(6.6%) had Moderate level of anaemia . In Control group, 18(60%) had Normal level of anemia , 6(20%) had mild level of anemia, 4(13.3%) had moderate level of anemia, 2(6.7%) severe level of anemia.

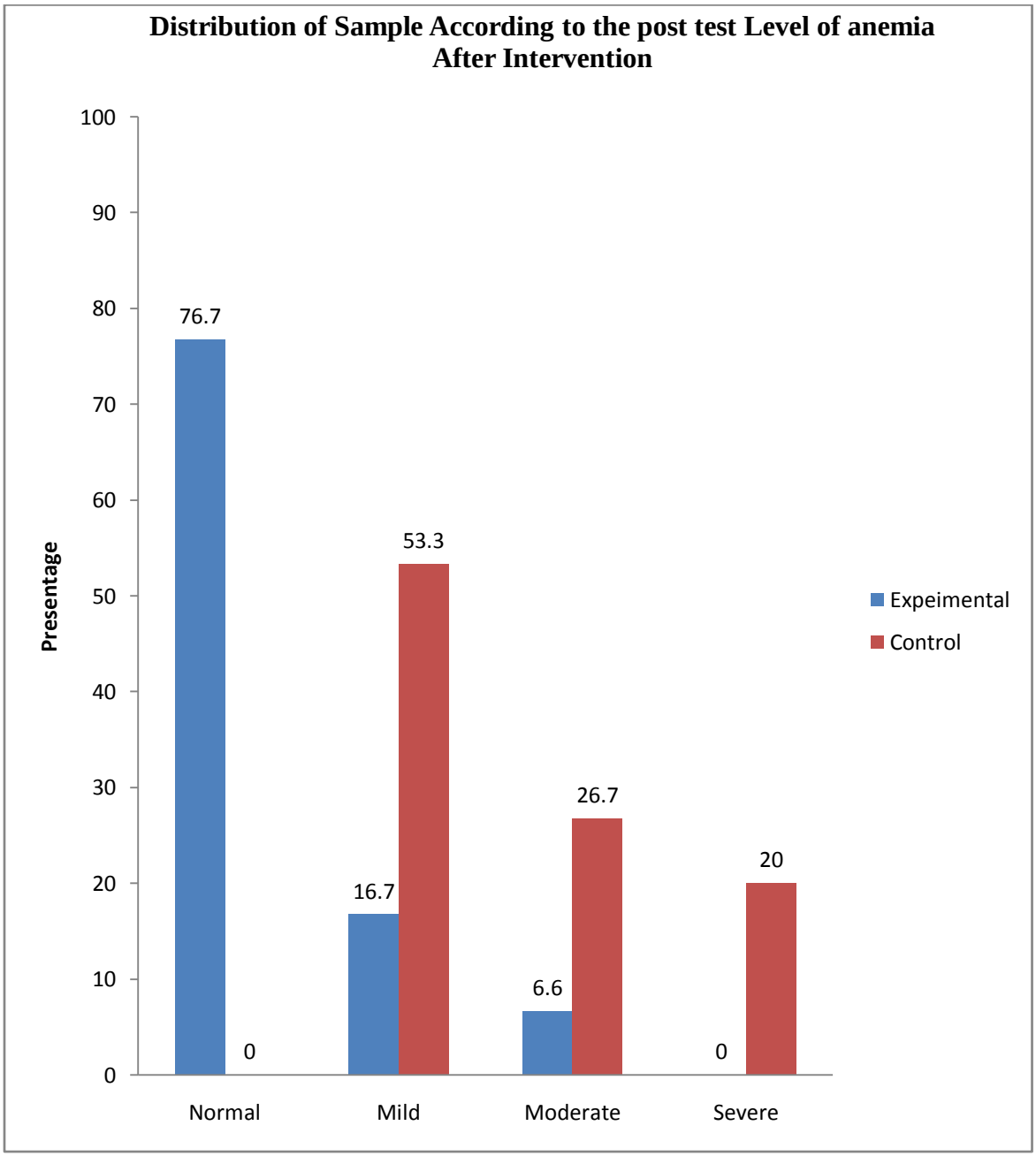

Fig -10 Distribution of Sample According to the post test Level of anemia After Intervention

SECTION-C

Testing Hypotheses

Comparison of Pre Test and Post Test Level of haemoglobin Among adolescent girls in Experimental Group and Control Group

Table-4 Mean, SD and paired 't' value on pre and post test level of haemoglobin among adolescent girls in Experimental group and Control group

N=60

S. No	Group	Mean	SD	Mean difference	Df	Paired 't' value
1.	**Experimental group**					
	Pre test	9.8	1.28	2.6	29	9.25*
	Post test	12.4	0.96			
2.	**Control group**					
	Pre test	8.7	0.79	0.01	29	5.20*
	Post test	8.8	0.83			

Table value t=9.25, * Significant at p > 0.05 level.

Represents, the mean score on level of anemia in Experimental group was 9.8 in pre test and 12.4 in post test. The paired 't' value was 9.25***** which is significant at p >0.05. It shows that nutrition ball was effective in improving the level of haemoglobin. Hence the research hypothesis (H_1) is accepted.

In Control group the mean score on level of haemoglobin was 8.7 in pre test and 8.8 in post test. The paired't' value was 5.20***** which is significant at p >0.05.

Comparison of post test level of haemoglobin among adolescent girls in experimental group and control group.

Table-5 Mean, SD and unpaired 't' value on level of haemoglobin among adolescent girls in Experimental group and Control group after intervention.

N=60

S. No	Groups	Mean	SD	Df	Unpaired 't' value
1.	Experimental	9.8	0.79	58	15.24
2.	Control	8.7	1.28		

Table value t=1.691, * Significant at p > 0.05 level.

Table - 5 represents, the mean score on level of haemoglobin in Experimental group was 9.8 in post test and 8.7 in Control group post test. The estimated 't' value was 15.24* which is significant at p > 0.05. It shows that Nutrition ball was effective in improving the level of haemoglobin. Hence the research hypothesis (H_2) is accepted.

SECTION -D

Table - 6 Association value of pre test level of haemoglobin with subjects in experimental and control group

S. No	Demographic Variables	Experimental Group					Control Group				
		f	%	df	χ^2	5% level of significance	f	%	df	χ^2	5% level of siginificance
1	**Age**										
	a) 15-16 years	23	76.7			5.99	19	63.3			5.99
	b) 17-18 years	7	23.3	2	1.44	NS	11	36.7	2	1.99	NS
	c)Above18 years	0	0				0	0			
2	**Food pattern**										
	a) Vegetarian	10	33.3	1	7.13	3.81	7	23.3	1	4.75	3.81
	b)Non vegetarian	20	66.7			NS	23	76.7			NS
3	**Type of family**										
	a)Nuclear family	22	73.3	1	0.47	3.81	21	70	1	13.9	3.81
	b)Joint family	8	26.7			NS	9	30			NS
4	**Family income**										
	a)Below 2000	4	13.3				3	10			
	b) 2000-4000	18	60	3	2.71	7.82	12	40	3	11.1	7.82
	c) 4000-6000	6	20			NS	13	43.3		3	NS
	d) Above 6000	2	6.7				2	6.7			
5	**Religion**										
	a)Hindu	25	83.3			5.99	5	16.7			5.99
	b) Christian	5	16.7	2	3.07	NS	25	83.3	2	1.52	NS
	c) Muslim	0	0				0	0			
6	**Menstural cycle**										
	a) 2-3 days	14	46.6				11	36.7			
	b) 4-5 days	12	40	3	12.3	7.82	9	30	3	11.2	7.82
	c) 6-7 days	2	6.7			NS	7	23.3		6	NS
	d) Above 7 days	2	6.7				3	10			

Table- 6 shows that, there is no significant association ($p<0.05$) between the anemia and demographic variables of adolescents in experimental and control group. Hence the research hypothesis H_2 rejected.

Summary

This chapter dealt with data analysis and interpretation in the form of statistical value based on objectives, independent ‘t’ test was used to evaluate the effectiveness of nutrition ball to increase haemoglobin. The chi-square test was used to find out the association between the anemia with their demographic variables in experimental and control group.

CHAPTER- V

DISCUSSION

The main aim of the study was to assess the effectiveness of nutrition ball to increasing the haemoglobin level among adolescent girls. The study was conducted by using true experimental pre and post test control group design. The present study was conducted in Maruthoorkurichi and Kaviyaloor villages at Kanyakumari District. The sampling technique is simple random Sampling technique was used for this study. The total sample size was 60, among them 30 were in the experimental group and 30 were in the control group haemometer was used for data collection. After data collection, data was organized, tabulated, summarized and analyzed. The study findings were discussed in this chapter with reference to the objectives of the study.

OBJECTIVES

1. To assess and compare the pre test and post test level of hemoglobin among adolescent girls in experimental and control group.
2. To find out the effectiveness of nutrition ball in haemoglobin level among adolescent girls with anemia in experimental group.
3. To determine the association between the pre test haemoglobin level among adolescent girls with their selected demographic variables in experimental and control group.

The first objective of this study was to assess the level of haemoglobin among adolescent girls in experimental and control group .

Out of 30 samples in the experimental group, 0(0%) of them had normal level of haemoglobin, 23(76.7%) of them had Mild level of haemoglobin, 4(13.3%) had Moderate level of haemoglobin, 3(10%) had Severe level of haemoglobin in their pre-test assessment. Whereas in the post-test 23 (76.7%) of them had normal level of haemoglobin ,5(16.7.%) of them had Mild level of haemoglobin, 2(16.6%) had Moderate level of haemoglobin, 0(0%) had Severe level of haemoglobin .

Out of 30 samples in the control group, 0 (0%) of them had normal level of haemoglobin, 18 (60%) of them had Mild level of haemoglobin, 8(26.7%) had Moderate level of haemoglobin, 4(13.3%) had Severe level of haemoglobin in their pre-test assessment. Whereas in the post-test 20 (66.7%) of them had normal level of haemoglobin, 6(20%) of them had Mild level of haemoglobin, 4(13.3%) had Moderate level of haemoglobin, 0(0%) had Severe level of haemoglobin .

Santos Rf. et al An experimental study was done to assess the impact of iron supplementation on anaemia during adolescent girls. Nutrition ball was prepared. Sixty volunteered adolescent girls, who were haemoglobin level below 10 mg/dl, undergo experimental trial. Ten non anaemic girls were included in control group. A questionnaire regarding general information was filled up. All the subjects were showing symptoms of anaemia but signs were not same. Majority (90 %) were showing paleness of eyes. Hb values of group B and C were more than the control group A and were found significant in comparison with group A. Thus iron supplementation in both forms (Tablet as well as Food) is helpful in managing anemia .The results concluded that there is a significant difference in anaemic condition of group iron tablet supplemented group (B) and iron Rich Food Supplemented group (C) as compared to control group (A). More improvement in hemoglobin values of group C was also noticed in comparison to group B but statistically the difference was found non significant. It is recommended that both kind of supplementation of iron are helpful in managing anemia among adolescent girls.

It was inferred that nutrition ball was highly effective in increasing haemoglobin level among adolescent girls with anemia.

It reveals that among control group the mean pre-test score was 8.7 with standard deviation with 0.79. The mean post-test was 8.8 with standard deviation 0.83. The mean difference was 0.04. The obtained ‘t’ value was 0.20, where as the table value was 2.04. It was significant at $p< 0.05$ level.

The second objective of this study was to find out the effectiveness of nutrition ball on anaemia among adolescent girls in experimental group and control group.

It reveals that among experimental group the mean post test score was 12.4 with standard deviation with 0.96. In the control group the mean post test was8.8, with standard deviation 0.83. The mean difference was 0.04. The obtained 't' value was 9.25, and the table value was , which was significant at $p< 0.05$ level.

It was inferred that nutrition ball is effective in increasing haemoglobin level among adolescent girls with anaemia. Hence hypothesis H_1 is proved.

Deeksha k et .al conducted a cross-sectional study was to determine the effectiveness of nutrition ball among the adolescents girls in the age group of 14-20 years from 20 different high schools located in three educational areas of Kermanshah, the capital of Kermanshah province in Western Iran. There were 47 girls (12.2%) with anaemia (Hb<12 g/dl and ferritin <20 microg/l). Around 57.3% of anaemic girls were found. There were no significant differences between the presence of anaemia and the level of education of parents. The mean levels of hemoglobin (Hb), hematocrit (Hct), mean corpuscular volume (MCV), mean cell hemoglobin (MCH) and mean cell hemoglobin concentration (MCHC) in studied adolescent girls from Western Iran were found to be lower than those reported for females aged 12-18 years. In conclusion, regarding the detrimental long-term effects and high prevalence of anaemia in Kermanshah, Western Iran its prevention could be a high priority in the programs of health system of the country and supplementation of a weekly iron dose is recommended.

The third objective to determine the association of pre test level of haemoglobin with their selected demographic variables

There is no significant association ($p<0.05$) between the level of anaemia and demographic variables.

It reveals that, there is no significant association ($p<0.05$) between the anaemia and demographic variables of adolescent in experimental and control group. Hence the research hypothesis H_2 is accepted.

Amatheum et. al (2008) conducted an experimental study to assess the daily consumption of nutrition ball raises blood level of haemoglobin in adolescent girls. According to research presented at 227th meeting of the American chemical society, the investigator selected 75 samples by using purposive sampling technique. The investigator gave 30 study participants each about 30gm nutrition ball for 30 days in addition to their regular diets and drew blood samples at given intervals following nutrition ball consumption . The findings of the study showed a direct link between the subjects nutrition ball consumption increase the level of hemoglobin in their blood.

Summary

This chapter deals with the discussion of the study with reference to the objectives and related studies.

CHAPTER VI

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter deals with summary, conclusion, limitation and recommendation of the study. Further it includes implications for the Nursing Practice, Nursing Education, Nursing Administration and Nursing Research.

SUMMARY OF THE STUDY

The aim of the study to assess the effectiveness of nutrition ball on haemoglobin among adolescent girls with anaemia in selected villages at Kanyakumari district.

The objectives of the study were;

1. To assess and compare the pre test and post test level of hemoglobin among adolescent girls in experimental and control group.
2. To find out the effectiveness of nutrition ball in haemoglobin level among adolescent girls with anaemia in experimental group.
3. To determine the association between the pre test haemoglobin level among adolescent girls with their selected demographic variables in experimental and control group.

A true experimental research design was chosen for this study. Simple random sampling technique was used for this study. Samples were selected based upon the inclusion and exclusion criteria. 60 samples were selected for the study. 30 Samples were assigned to the experimental group and 30 samples were assigned to the control group. The tool used to collect the data consisted of two parts,

Part I: consisted of demographic Variables with age, food pattern, type of family, family income, religion, menstrual cycle.

Part II: consisted of haemometer to assess the level of haemoglobin among adolescent girls.

Reliability of the tool was calculated by using test-retest method(r =0.9). Data collection was done for 4 weeks. Sample were selected based on the inclusion and exclusion criteria. Pre test was done by using demographic variables and haemometer.

After the nutrition ball intervention post test was done. Collected data was analyzed by both descriptive statistics (mean, standard deviation, frequency and percentage) and inferential statistics (paired and unpaired 't' test, chi-square) and results were calculated.

MAJOR FINDINGS OF THE STUDY

It reveals that among experimental group the mean pre-test score was 9.8 with standard deviation with 1.28.The mean post-test was 12.4 with standard deviation 0.96. The mean difference was 2.6. The obtained 't' value was 9.25, where as the table value was 2.04. It was significant at $p< 0.05$ level.

It was inferred that nutrition ball was highly effective on haemoglobin among adolescent girls with anaemia.

It reveals that among control group the mean pre-test score was 8.7 with standard deviation 0.79. The mean post-test was 8.8 with standard deviation 0.83. The mean difference was 0.01. The obtained 't' value was 5.20, where as the table value was 2.04. It was significant at $p< 0.05$ level.

With regard to the association between the pre test level of haemoglobin among adolescent girls in experimental and control group with their selected demographic variables.

CONCLUSION

The main conclusion of the present study is nutrition ball which is effective on haemoglobin level among adolescent girls with anemia which is denoted by significant level of anaemia. After the intervention there had been a significant increase in level of haemoglobin. The selected samples became familiar and found themselves comfortable and also expressed satisfaction.

IMPLICATION OF THE STUDY

Nursing implication includes specific information for Nursing practice, Nursing Education, Nursing Administration and Nursing research. Nursing implication for this study is,

NURSING PRACTICE

- Nutrition ball can be introduced as a stimulating mode of intervention by the nurses for promoting haemoglobin among the adolescent girls suffering from anaemia
- Nutrition ball can be incorporated into routine nursing intervention.
- Nutrition ball plays a very effective and non invasive intervention for treating anaemia.

NURSING EDUCATION

It is important to have educational programme on nutrition ball for all nursing students, so that they can apply this technique to increase the haemoglobin experienced by the inpatients in the hospital.

- Adolescent girls residing in institution are at greater risk developing anaemia.
- The nursing curriculum must give importance far early detection and prevention of anaemia among adolescent girls by using cost effective and pharmacological intervention.

NURSING ADMINISTRATION

- Nursing administrator can organize in-service education programmes for staff nurses regarding nutrition ball.
- Nurse administrator should make the public aware about the nutritional problems among adolescent girls in institutionalized living.
- In service education may be conducted for nurse especially community health nurses regarding various non-pharmacological intervention to treat anaemia among adolescent girls.

- Every administration should provide adequate support to conduct prevalence of anaemia program periodically.

NURSING RESEARCH

Researchers should focus on non-pharmacological interventions to increase haemoglobin level.

The findings should be disseminated through conferences, seminars and publications in professional, national and international journals.

LIMITATION:

- Study have both experimental and control group.
- The duration of the intervention was short.
- The setting of the study was two areas.
- The study is limited to adolescent girls between the age group of 15-18 years.

RECOMMENDATIONS

Recommendations include;

- A similar study could be conducted with anaemia for adolescent girls to find out the effectiveness of the nutrition ball.
- Similar study can be done in larger samples.
- Comparative study can be done between community and institutionalized adolescent girls.
- Similar study can be done for antenatal mothers.
- True experimental study can be done to assess the effectiveness of nutrition ball among adolescent girls in community area.

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APPENDICES: A

Tel. (O) : 273297
270753

GLOBAL COLLEGE OF NURSING

Recognised by the TNC & INC
Affliated to Tamil Nadu Dr. M.G.R. Medical University
Edaivilagam, Nattalam, Kanyakumari District.

Off: S.G. Multi Speciality Hospital, Old Theatre Jn, Pammam, Marthandam - 629 165,
K.K. Dist., Tamil Nadu. Mob : 9443606955, 9944110448

Lr.No:GCN/73/04/2016 01/04/2016

To

The Medical Officer,
Primary Health Centre,
Cherikadai.

Sir,

Sub: Permission seeking letter for the conduct of research-Reg.

This is to request you to kindly permit Mrs.RATHI.R, 2nd year M.Sc. (N), from Global College of Nursing to conduct her research study.

STATEMENT OF THE STUDY

"A STUDY TO ASSESS THE EFFECTIVENESS OF NUTRITION BALL ON HAEMOGLOBIN LEVEL AMONG ADOLESCENT GIRLS WITH ANAEMIA IN SELECTED AREA AT KANYAKUMARI DISTRICT"

So kindly consider this letter and do the needful.

Thanking You,

Yours,
Principal
GLOBAL COLLEGE OF NURSING
Edavilagam, Nattalam,
Kanyakumari District - 629 165

GLOBAL COLLEGE OF NURSING * NATTALAM, K.K. DIST. - 629 165 *

மருத்துவ அலுவலர்
அரசு ஆரம்ப சுகாதார நிலையம்
பள்ளியாடி - 629 169

APPENDICES: B

ETHICAL CLEARANCE CERTIFICATE

Tel. (O) : 273297
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GLOBAL COLLEGE OF NURSING

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Edaivilagam, Nattalam, Kanyakumari District.

Off: S.G. Multi Speciality Hospital, Old Theatre Jn, Pammam, Marthandam - 629 165,
K.K. Dist., Tamil Nadu. Mob : 9443606955, 9944110448.

ETHICAL CLEARANCE CERTIFICATE

Mrs. Rathi R. (Community Health Nursing)

Sub: Your letter dated 25/04/2015 for the approval of above reference study and its related documents.

Ref: "A study to assess the effectiveness of Nutrition Ball to increase Haemoglobin level among adolescent girls with anemia in selected villages at Kanayakumari District" Ethics committee of Global College of Nursing, Edavilagam, Nattalam, Marthandam. Reviewed and discussed the study proposal the documents submitted by you related to the content of the above referenced study and its meeting held on 04/05/2015.

The following Ethical committee members were present at the meeting held on 04/05/2015.

S.No.	Name	Profession	Position in the committee
1.	Prof. Josephine Ginigo	Nursing	Chair Person
2.	Dr. Sam.G.Jeba Joselin	Medical	Basic Medical Scientist
3.	Mrs. Vijila Berlin	Nursing	Clinician
4.	Adv. Sreenivasan	Legal	Legal Exports
5.	Prof. A. J. Benzam	Social	Social Scientist
6.	Dr. Ahilan	Management	Philosopher
7.	Mr. Sujin	Lay person	Community Person

After due Ethical and scientific consideration, the ethics committee has approved the above presentation submitted by you.

With Regards

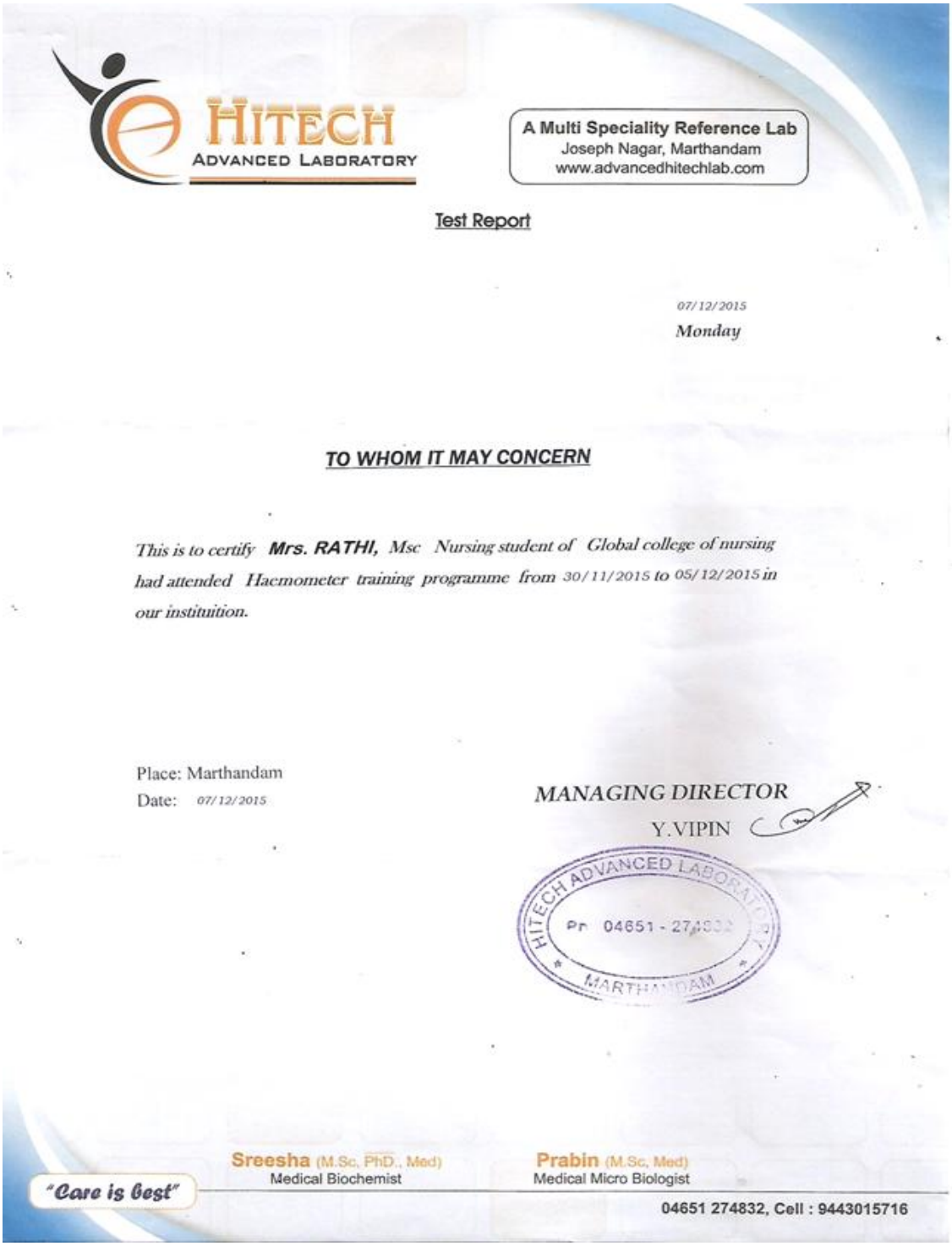
Date: 04/05/2015
Place: Nattalam

Prof. Josephine Ginigo
Ethics Committee Chair Person
Global College of Nursing, Edavilagam, Nattalam

Principal
GLOBAL COLLEGE OF NURSING
Edavilagam, Nattalam,
Kanyakumari District - 629 165

APPENDICES: C

CERTIFICATE FOR HAEMOMETER



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Test Report

07/12/2015
Monday

TO WHOM IT MAY CONCERN

This is to certify **Mrs. RATHI,** Msc Nursing student of Global college of nursing had attended Haemometer training programme from 30/11/2015 to 05/12/2015 in our instituition.

Place: Marthandam
Date: 07/12/2015

MANAGING DIRECTOR
Y.VIPIN

HITECH ADVANCED LABORATORY
Ph 04651 - 274832
MARTHANDAM

"Care is best"

Sreesha (M.Sc, PhD., Med)
Medical Biochemist

Prabin (M.Sc, Med)
Medical Micro Biologist

04651 274832, Cell : 9443015716

APPENDIX: D

LETTER SEEKING EXPERTS OPINION FOR VALIDITY OF TOOL

Form

Rathi. R
II year MSC Nursing
Global College of nursing
Nattalam

To

Respected Sir/ Madam

I am doing II year MSC nursing in Global College of Nursing, Nattalam, As a partial fulfillment of course, I have choosen a topic of my interest **"A study to assess the effectiveness of Nutrition ball to increase Haemoglobin level among adolescent girls with anaemia in selected villages at Kanyakumari district".** I have prepared demographic data and standardized tool. I here kindly request you to evaluate the tool based on the evaluation criteria. your opinion and suggestions will help me to the successful completion of my study.

Thanking You,

Your's faithfully,

APPENDIX: E

EVALUATION CRITERIA CHECK LIST FOR VALIDATION

Introduction

The expert is requested to go through the following criteria for evaluation. Three columns are given for responses and a coloumn for remarks. Kindly place tick mark in the appropriate column and give remarks.

Interpretation of column

Column I : Meets the criteria

Column II : Partially meet the criteria

Column III : Does not meet the criteria

Serial No	Criteria	1	2	3	Remarks
1	Scoring - Adequacy - Clarity - Simplicity				
2	Content - Logical sequence - Adequacy - Relevance				
3	Language - Appropriate - Clarity - Simplicity				
4	Practicability - It is easy to score - Does it precisely - Utility				

Signature : Any other Suggestion

Name :

Designation :

Address :

APPENDICES: F

LIST OF EXPERTS FOR TOOL VALIDATION

1. **Dr. Ashwin Pradeep, MBBS**
   Medical Officer
   Primary Health Centre
   Cherikadai

2. **Mrs. Sahaya Selvi, M.Sc., (N)**
   Principal,
   Grace College of Nursing,
   Padanthalumoodu.

3. **Mrs. Feby. G, M.Sc., (N)**
   Vice -Principal,
   Thasiah College of Nursing,
   Marthandam.

4. **Mrs. Jasmin Shylaja. M, M.Sc., (N)**
   Vice –Principal,
   CSI College of Nursing,
   Marthandam.

5. **Mrs. Anbu Malar. J, M.Sc., (N)**
   Reader,
   White Memorial College of Nursing,
   Attoor.

6. **Mrs. Anitha. S, M.Sc., (N)**
   Lecturer,
   P. S. College of Nursing,
   Thalakulam.

APPENDICES: G

CERTIFICATE OF ENGLISH EDITING

TO WHOM SO EVER IT MAY CONCERN

This to certify that Mrs. Rathi .R, II year M.Sc. Nursing of Global College of Nursing, Nattalam, has done a dissertation study interest **"A study to assess the effectiveness of Nutrition ball to increase Haemoglobin level among adolescent girls with anaemia in selected villages at Kanyakumari district".**

This study was edited for English Language appropriateness by :

Mr. Helendy Solomon, M.A., M.E.D., M.Phil.

Signature:

APPENDICES: H

PERMISSION LETTER

I **Mrs.R. Rathi Stebin,** M.sc (N) II year student of Global college of nursing, conducting A study to assess the effectiveness of nutritional ball to increase haemoglobin level among adolescent girls with anaemia in selected villages at Kanyakumari district as a partial fulfillment of the requirement for the degree of M.sc (N). Nutritional ball will be provided in morning for 30 days. Haemometer is the tool used to assess the level of bloodvalue. So, I request you to kindly permit to prick the clients to take the value of pre test and post test for my study.

Thanking you

Signature

MEDICAL OFFICER
GOVT. PRIMARY HEALTH CENTRE
PALLIYADI - 629 169

APPENDICES: I

INFORMED CONSENT

Dear girls,

I, Mrs.Rathi R., M.Sc. Nursing, II year student of Global College of Nursing, conducting a **"A study to assess the effectiveness of Nutrition ball to increase Haemoglobin level among adolescent girls with anaemia"** as a partial fulfillment of the requirement for the degree of M.Sc. Nursing under the Tamil Nadu Dr. M.G.R. Medical University the nutrition ball is provided to the client for 30 days. I assure you that information obtained will be kept confidential. So, I request you to kindly co operate with me and participate in this study by giving your frank and voluntary consent.

Thank you,

Signature:

APPENDIX –J

SECTION: A

Demographic variables:

1. Age

a.15-16 years

b.17-18 years

c.Above 18 years

2. Food pattern

a.Vegetarian

b.Non vegetarian.

3. Type of family

a.Nuclear family

b.joint family

4. familyincome

a.Below 2000

b.2000-4000

c.4000-6000

d.Above 6000

5. Religion

a.Hindu

b.Christian

c.muslim

6. Menstrual cycle

a. 2-3 days

b. 4-5 days

c. 6-7 days

d. Above 7 days

APPENDIX –K

INTERVENTION

PROCEDURE OF HAEMETER

BLOOD COLLECTION AND TESTING KIT

The haemometer method utilizes the original technique for measuring haemoglobin colormetrically with a haemometer Hb is a chromoprotein hence the Hb cotent in a blood sample.may be determined by measurement of its colour.

PRINCIPLE:

Hb is converted to acid haematin by addition of 0.1N hydrochloric acid and resulting brown colour is compared with standard brown glass reference blocks of a haemometer.

METHODS OF USE:

The haemometer may be calibrated so that the 100% level is equivalent to 14g % (or any other value)haemoglobin level when the reading is taken 3 min after blood is added to the acid in the diluting tube. The diluting tube is filed up to the 20 marks with 0.1 NHCL and then one drop of blood sample is blown gently into it, raising the pipette repeatedly with acid. The tube is allowed to stand for exactly 3 min. After this small volumes of water are added sequentially, and at stage the total contents are mixed. The brown colour is matched with that of the standard of the diluted tube. Taking 100% as 14g %, based on the level of the mixture in the tube giving the same brown colour as the stand, the haemoglobin content in the blood is calculated.

APPENDIX –L

PHOTOGRAPH